NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

Shredded coconut entering warm-air tunnel dryer on 8-ft. conveyor belt at Franklin Baker plant in Hoboken, N. J.

JUNE, 1949: **Pleasing growers, Building a big market, How not to run a plant, Quick pasteurizing, Antiseptic cooling, Electronic control, Report**

SAVE WITH LIQUID SUGAR!

No!

MANUAL UNLOADING

REHANDLING, DUMPING AND FILTERING

BOOKKEEPING

EMPTY BAGS

Easier and cleaner to use
Eliminates costly handling
Increases production efficiency

Liquid sugar eliminates the heavy cost of unloading, storing and opening sugar bags . . . dumping sugar into kettles . . . dissolving . . . filtering . . . and the constant expense of bag handling and returning. Liquid sugar enables one man to do the work of five . . . or more.

Liquid sugar is cleaner, more efficient. It is metered into your processes, easily and precisely–by the turn of a valve. It gives you continuous, automatic control–a streamlined sugar supply. Using liquid sugar may also help you to convert to continuous production methods, at great savings over batch methods.

To switch from dry to liquid sugar requires only the installation of storage tanks and piping, the cost of which is quickly returned by savings in labor and increased efficiency.

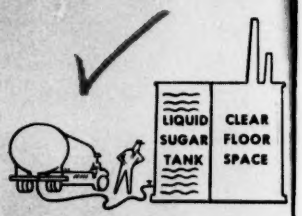
NOW, FOR THE FIRST TIME, LIQUID SUGAR CAN BE AVAILABLE ANYWHERE!

Cyanamid's new process, based on ion exchange, makes it possible for you to produce liquid sugar right in your own plant . . . or have it delivered at your plant door from a local refinery. It produces from raw sugar a refined liquid sugar equal in odor, color and taste to refined white sugar dissolved in water–and better in ash content. This process is highly adaptable–it also produces less highly refined liquids, according to your needs, at an economical cost.

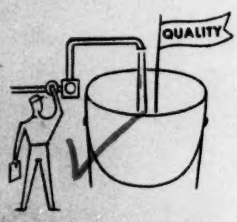
IF YOU ARE A LARGE USER, requiring 20-30 or more tons a day, it may pay you to produce liquid sugar in your own plant.

IF YOU ARE A SMALLER USER, you can combine with others in your area to produce your needs. Or you may find that there is already an independent ion exchange liquid sugar plant in your area. Whatever your needs, fill out the coupon below for more complete information.

Yes!



AUTOMATIC DELIVERY



AUTOMATIC HANDLING

SAVINGS

AMERICAN Cyanamid COMPANY

ION EXCHANGE PRODUCTS DEPARTMENT • 30 Rockefeller Plaza, New York 20, N. Y. F6

☐ Is liquid sugar produced by ion exchange available in our area? From whom?

☐ We are interested in making liquid sugar in our own plant, and would like a rough estimate of initial cost and operating cost . . . and the savings we can expect to effect. Use ___ tons per day (working day of ___ hrs.) for estimate

*Name*_____

*Company*_____

*Street*_____ *City*_____ *State*_____

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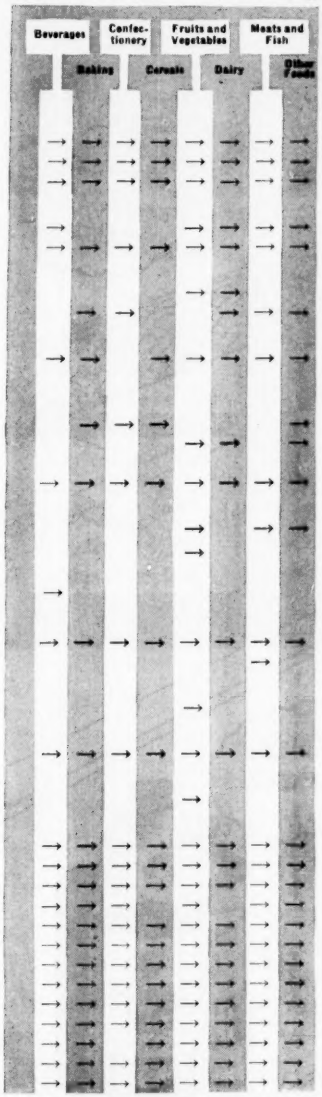

Food Industries

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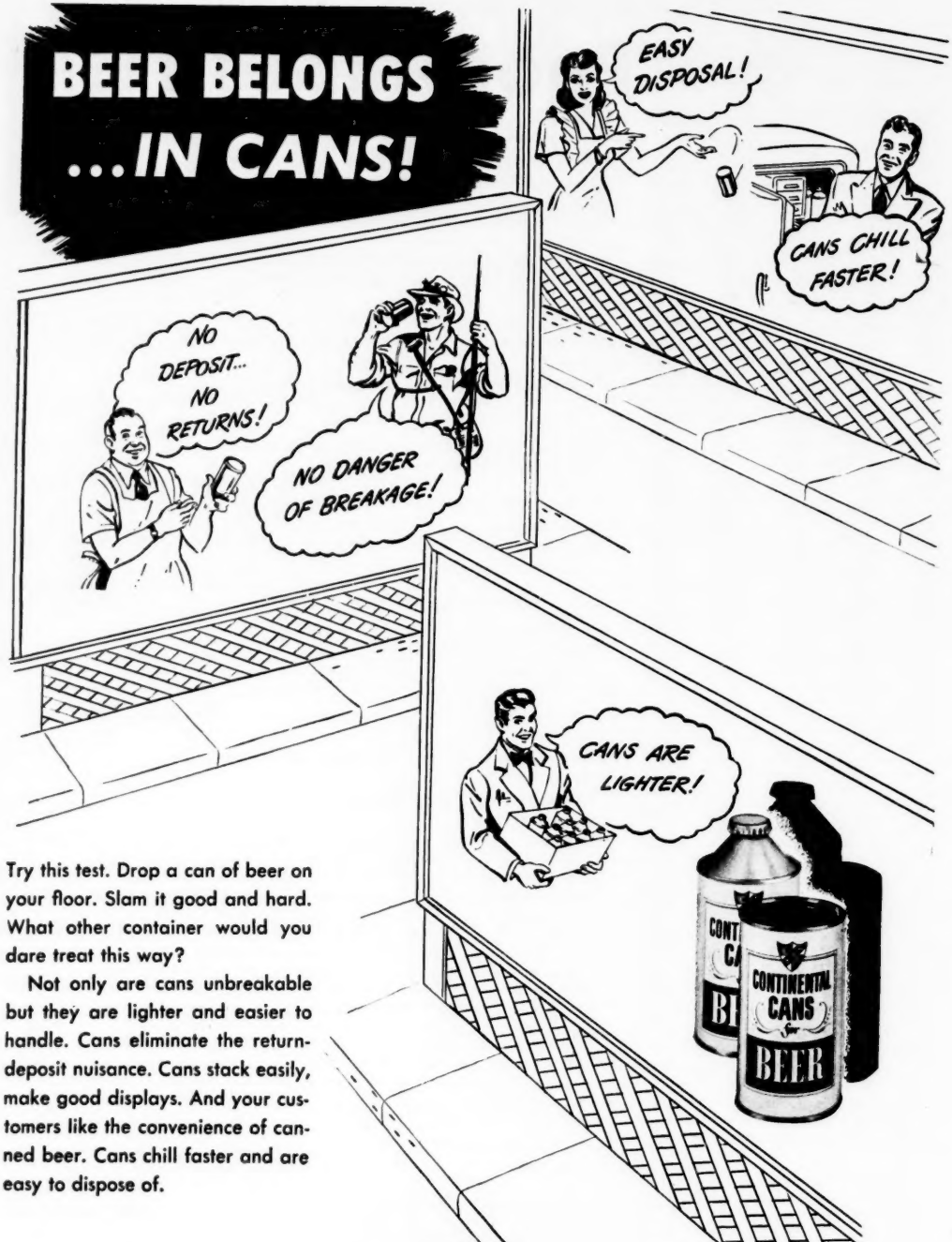
BEER BELONGS ...IN CANS!



Try this test. Drop a can of beer on your floor. Slam it good and hard. What other container would you dare treat this way?

Not only are cans unbreakable but they are lighter and easier to handle. Cans eliminate the return-deposit nuisance. Cans stack easily, make good displays. And your customers like the convenience of canned beer. Cans chill faster and are easy to dispose of.

CONTINENTAL CAN COMPANY

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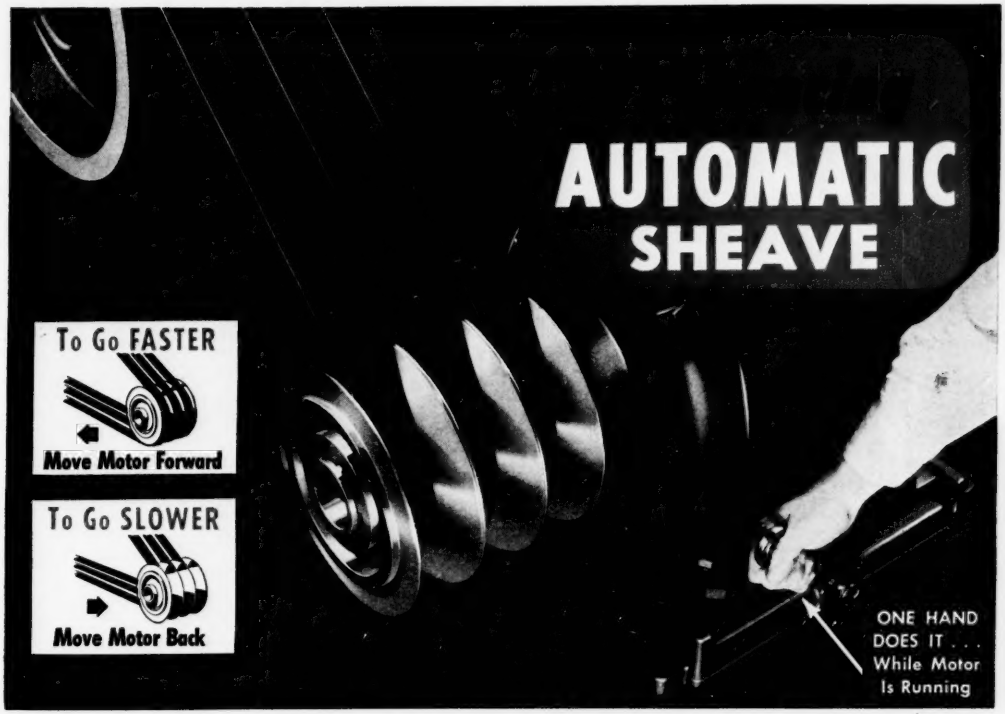

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A-2709

- Instant speed control at lower cost than ever before
- Covers most speed changing needs from 3 to 20 hp
- Extremely simple — one sheave does all
- Infinitely variable speed — 200% range

SIMPLEST, most economical method of instant speed control ever devised. Simply move motor forward to increase speed and move it back to decrease. The new *Vari-Pitch* Automatic Sheave changes pitch diameter and holds belts at proper tension automatically. All other parts of the drive are standard *Texrope* V-belt drive components.

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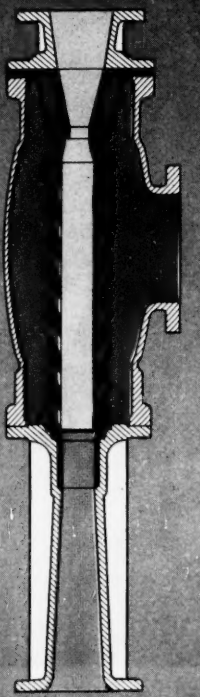
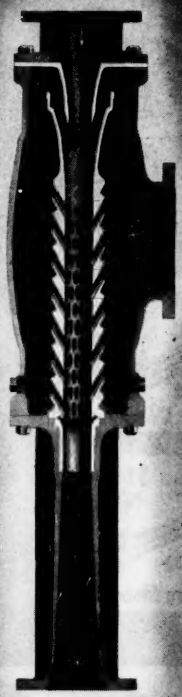
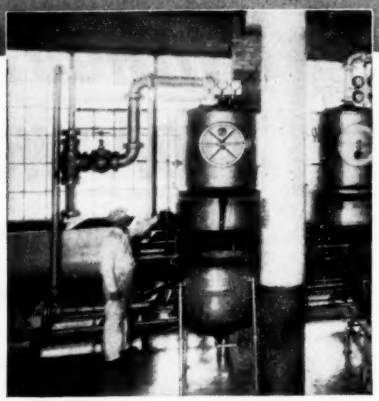
Get...

THEN FORGET THIS EDUCTOR CONDENSER







Three SK Eductor Condensers, only one of which is shown, are used on vacuum kettles in the food manufacturing plant above.

The SK Eductor Condenser has no moving parts to get out of order, adjust or repair. It's simply designed to require minimum maintenance and insure efficient operation in various processes requiring medium or high vacuum. You can install it and then forget it.

In operation, the injection water is delivered to the top inlet of the condenser at a constant pressure of 10 lbs. which, combined with the internal vacuum, produces sufficient jet energy to discharge the water through the tail diffuser against atmospheric pressure. The water jet condenses the steam, entrains the non-condensible gases and discharges the mixture into a hotwell tank without the use of an external vacuum pump.

Ideal for use with small engines or turbines and in process operations in the food, chemical and refinery fields, SK Eductor Condensers are made in sizes ranging from 1½" to 10" inclusive.

You can get full details on construction and operation by requesting Bulletin 5-B.

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Manufacturing Engineers

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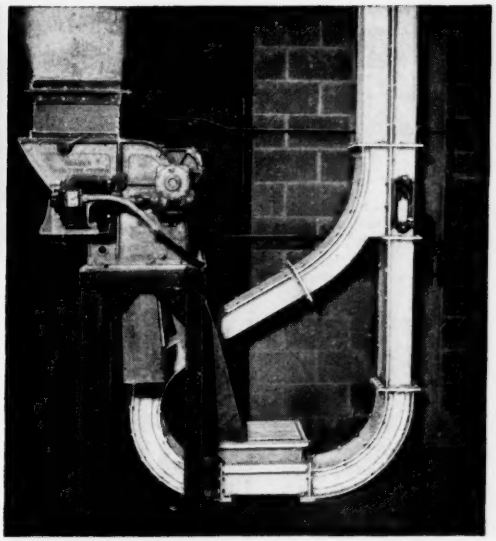
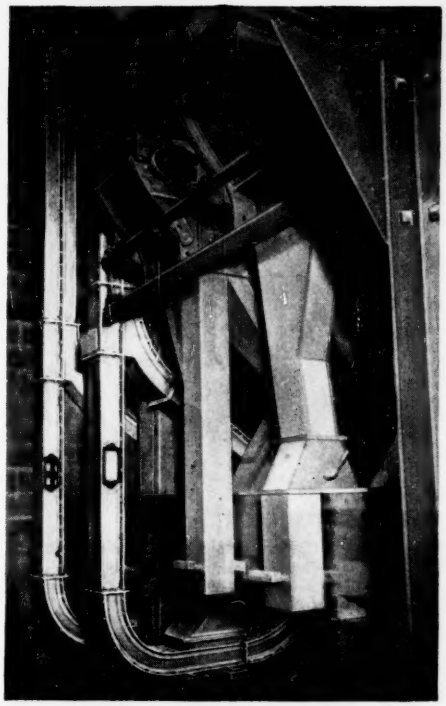
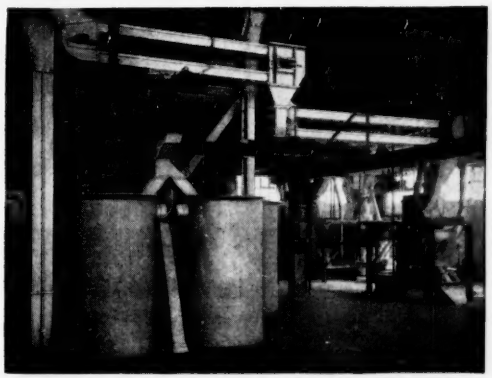
How LINK-BELT BULK-FLO Conveyors serve a modern flour packaging plant...



Loop-Loading foot end of Bulk-Flo elevator, 62 ft. high, for handling flour from two collecting hoppers on first floor to a horizontal Bulk-Flo conveyor on fourth floor of packaging plant.



Foot end of two Link-Belt Bulk-Flo elevators, Loop-Loading type, handling blended flour from storage tanks (via percentage feeders and screw conveyors) to horizontal Bulk-Flo conveyors feeding collecting-tanks on fourth floor of packaging plant.



General view on fourth floor of flour packaging plant, showing vertical and horizontal Bulk-Flo conveyors. Vertical machines have Loop-Loading arrangement.

How LINK-BELT BULK-FLO Conveyors can serve you...

Link-Belt Bulk-Flo Conveyors are being used to handle flour, sugar, soy bean meal, nuts and a wide variety of free-flowing materials. Entirely enclosed in dust-tight casing, Bulk-Flo provides gentle handling with minimum degradation and contamination. It is self-loading, self-discharging and largely self-cleaning. May we send you Book No. 2175?

We invite you to discuss the lower cost Bulk-Flo way of handling materials with a Link-Belt engineer.

11,685

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 3, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

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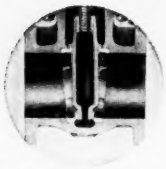
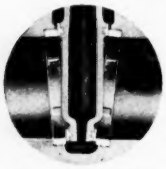
CONVEYING MACHINERY



Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated type are screwed into the body.

Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.

WALWORTH

iron body gate valves

with screwed or flanged ends

... 8 Outstanding Features

For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

Brass Liner on Glands assures greater resistance to corrosion and scoring.

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valves and fittings

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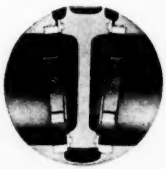
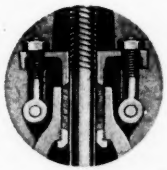
T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.

Bronze Back-Seat Bushings in bonnets of OS&Y valves.



Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

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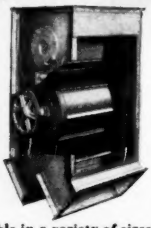
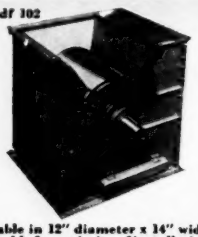
Magnetic drum element above can be ordered separately. Shaft diameters are standard to permit replacement in existing installations without changing bearing or shaft mountings. Ordinarily installed at discharge end of gravity flow chutes, spouts, or other conveyors.

TYPE df 101



Available in a variety of sizes, 12", 18" and 24" diameters. Utilizes a reverse feed which eliminates glancing. Adjustable check gate regulates and evenly feeds material. Shell rotates on shielded precision ball bearings, completely sealed in a dust proof mounting. Unit is fully enclosed, fully automatic and of all metal construction.

TYPE df 102



Available in 12" diameter x 14" width. Adaptable for majority of installations. Bearings are same as df 101 drum. Adjustable check gate regulates and evenly feeds material. Drum and housing are furnished ready for installation. Unit is fully enclosed, fully automatic and of all metal construction.

AFTER two years of field testing in every industry, Eriez offers industry this completely new, revolutionary magnetic drum type separator. Self-cleaning, and powered by permanent non-electric magnets, the Eriez separates ferrous materials at far lower cost. There's no operating or maintenance expense . . . no need for current or wiring . . . you get safe, spark-proof reliable magnetic protection right around the clock. There's nothing to get out of order—no attendant electrical accessories . . . the powerful magnetic field of the Eriez is Permanent and magnetic separation is amazingly simple. A look at the diagram below shows how it's done.

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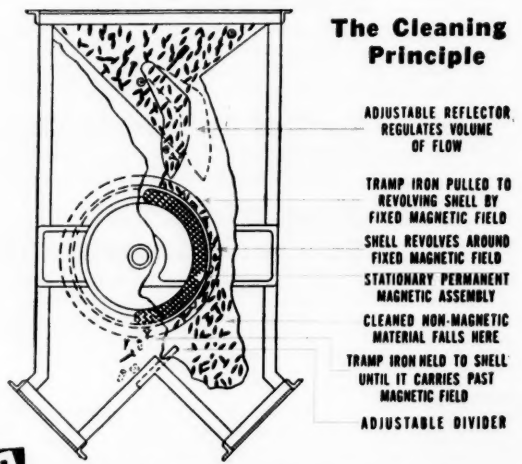
Chemicals	Tobacco	Fertilizers
Grain	Explosives	Metals
Plastics	Crumb Rubber	Textiles

The Cleaning Principle



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- Product contact parts made of corrosion-resisting materials.
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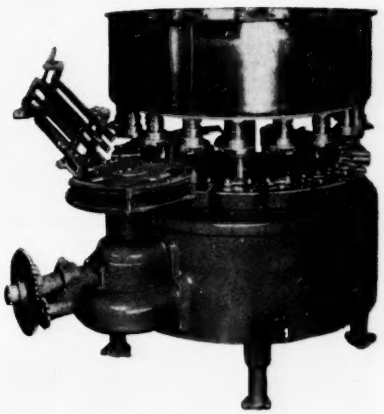
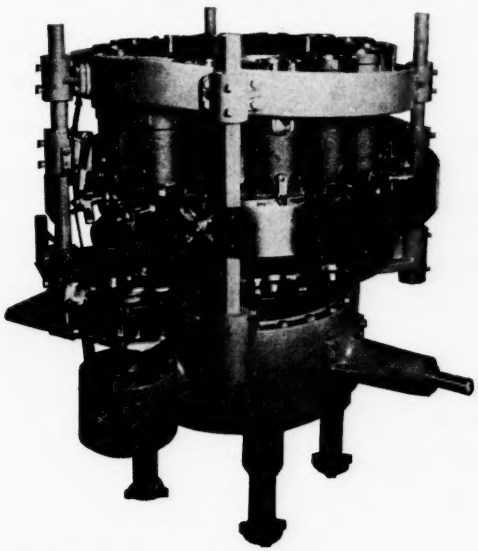


PISTON TYPE



- Fills any semi-liquid or semi-solid product at the rate of 350 to 400 No. 2 cans per minute.
- Features single point adjustment for accuracy of fill.
- Equipped with "no-can-no-fill" device—prevents waste.
- All movable contact parts easily removable by hand for cleaning—made of corrosion-resistant materials.
- Totally enclosed base protects working parts.
- Easily adapted to all closing machines.

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And two big reasons for the long, trouble-free operation of Norton Labelers are: (1) The reliable time-proven Oslund design; (2) Norton precision manufacture.

In the Norton Automatic Labeler you get the benefit of Norton Company's 49 years' experience in building precision grinding and lapping machines to extremely close limits both for dimensional accuracy and surface finish.

A new sound and color motion picture demonstrates graphically the design and construction features of the Norton Labeler—write for information.

NORTON COMPANY, WORCESTER 6, MASS.

(Photograph courtesy Staley Mfg. Co., Decatur, Illinois)

L-16

NORTON

AUTOMATIC LABELERS

..Use Century Type RS Single Phase Brush Lifting Motors

Century Type RS, repulsion start, induction, single phase brush lifting motors are ideal for installation on reciprocating pumps, compressors and other hard-to-start equipment.

They provide the power to start under load — even in very cold weather — without overmotoring the driven machine.

Repulsion start motors provide greater starting torque per ampere of current than any other type of single phase motor — consequently the least disturbance to line voltage — an advantage on long or small capacity transmission lines.

They are widely used in the rural areas which usually have only single phase energy.

Many power companies are recommending the use of single phase motors up to 7½ HP, in residential districts of the larger cities, because polyphase energy is not always available.

Century Type RS brush lifting motors are built in sizes from ½ to 20 HP.

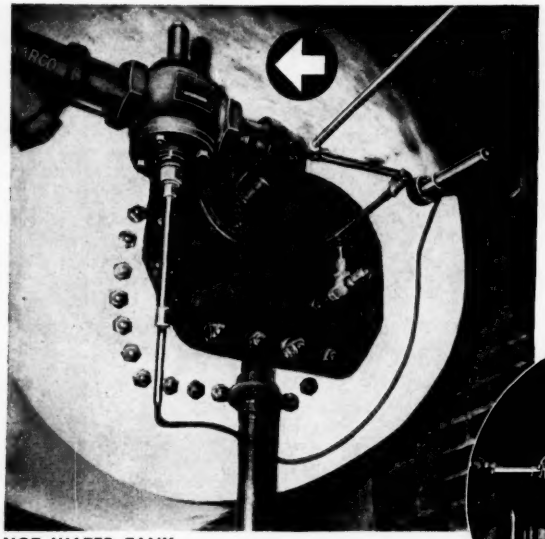
Century builds a wide range of types of motors from 1/6 to 400 horsepower for all the popular electric power applications.

Specify Century motors for all your electric power requirements.

Popular types and standard ratings are available from factory and branch office stocks

CE-628

Century Motors



HOT WATER TANK

Why the Best HOT WATER SERVICE *Costs Less!*

It's not a luxury to have all hot water services Sarco Temperature Controlled. In fact, on most jobs, the controls pay for themselves in four ways.

1. Automatic control prevents overheating — fuel is saved
2. "Never too hot, never too cold," increases quality and quantity of output in heat processing
3. Blending of water for showers and wash basins increases hot water storage capacity
4. Everything works, 24 hours a day, without shut-downs or complaints.

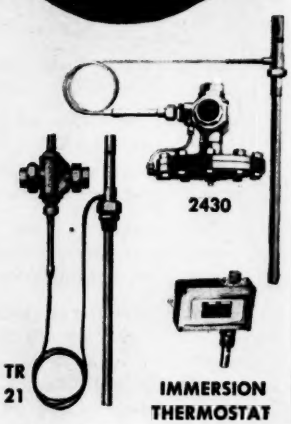
In a factory, a service tank was controlled for twenty-four years at a cent a day. A mine saved hundreds of dollars by installing Sarco Blenders for showers, and dish washing.

What would Sarco Temperature Controls save in your plant? Why not ask the Sarco Man near you?

STORAGE TANK

BLENDED WATER

MB BLENDER



2430

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241

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VODOL-XX is the exclusive product of Refining Unincorporated

GOLDEN BROWN
Naturally
Free-flowing!

VODOL-XX

Famed throughout the industries as the

CORN-OIL LECITHIN

(BONE-DRY)

IN THEIR OWN PRODUCTS—in continuous use of VODOL-XX over long periods—representative food industries have proved its unequalled advantages to their complete satisfaction. Pure virgin corn oil provides nature's finest lecithin! Processing by Refining Unincorporated has brought its incomparable qualities to perfection.

THE BONE-DRY CHARACTERISTIC OF VODOL-XX positively prevents any moisture disturbance. (Important to the chocolate manufacturer.)

Free-flowing VODOL-XX also means

- No pre-heating, pre-dissolving, straining nor thinning
- Instant solubility at low temperatures
- Ready dispersion in fats
- Freedom from lecithin taste and odor in end product
- Longer shelf-life and freshness

Join the others who have found VODOL-XX the most satisfactory on all counts in

Packing Industries • Baking • Confections • Drugs and Cosmetics
All processing using Lecithin

FREE!
VODOL-XX for plant test

Judge VODOL-XX in your own plant—at our expense. *Mail Coupon Today!*

FI-649

Refining Unincorporated
407 S. Dearborn St., Chicago 5, Illinois
Without obligation, I'll be glad to give VODOL-XX a trial in our plant.

Name _____

Position in firm _____

Firm Name _____

Address _____

INSURES ECONOMY OF DESIGN

The steaming machine pictured above demonstrates how the flexibility of Wissco friction drive belts makes possible a very compact installation. Wissco Conveyor Belts can be engineered to meet *your* exact needs.

BECAUSE WISSCO BELTS are woven of flattened wire spirals, they operate efficiently over small diameter pulleys. They lend themselves to equipment where lack of space precludes the use of large pulleys and can be custom-engineered to operate by chain or friction drive.

And Wissco Belts have the stamina and built-in toughness that insure maximum production at low cost regardless of operating conditions—white heat or subzero—abrasion—corroding chemicals or other grueling punishment.

Send today for our illustrated catalog showing types and advantages of numerous conveyor belt constructions.

WISSCO METAL CONVEYOR BELTS

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

CF&I

Belt Sales Office and Plant—56 Sterling St., Clinton, Mass. • *Executive Office*—500 Fifth Avenue, New York 18, N. Y.
Sales Offices—Boston, Buffalo, Chattanooga, Chicago, Denver, New York • *Pacific Coast Subsidiary*—The California Wire Cloth Corp., Oakland 6, Cal.

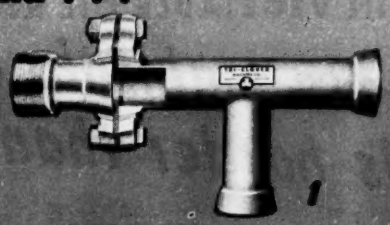
need help with your

CORROSION *problems?*

— let Tri-Clover SPECIALIZED EXPERIENCE lend a hand . . .

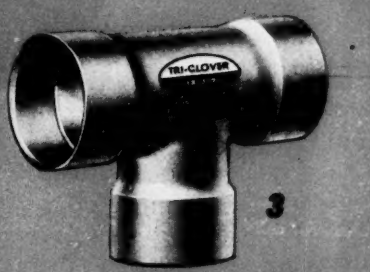
USE THE RIGHT FITTING TYPE FOR EVERY JOB . . .

It will pay you to take advantage of Tri-Clover's 30 years of specialized experience in solving the most difficult corrosion problems. Having a *complete* line of stainless steel and nickel alloy fittings, valves and pumps to choose from, Tri-Clover engineers are able to recommend *exactly* the right type and size to meet your conveying line needs. If you prefer, send us a sample of your product for laboratory tests and we will furnish complete recommendations covering the type of corrosion-resistant fittings and lines best suited for your use. Illustrated are four typical Tri-Clover fitting types:

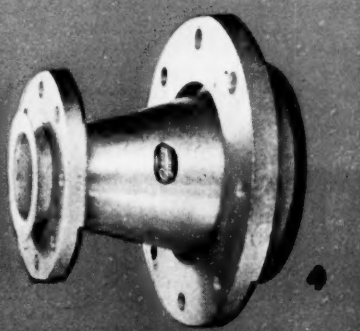


1 **Assembled section of Flanged Conical-End Fitting showing IPS adapter. Available in a complete line, 1" thru 4" O.D.**

2 **World-famous Tri-Clover Sanitary Fittings and Valves are available in a complete line of stainless steel and nickel alloy types, 1" thru 4" O.D. for all sanitary code requirements.**



3 **Recessed-End Fittings . . . easily assembled by soldering, brazing or socket welding. Available in a complete line, ¾" thru 10" O.D.**



4 **Typical "Zephyrweld" Welding Fitting Reducer with Van Stone welding nipples and slip-on flanges for easy, fast assembly. Available in a complete fitting line, from ¾" thru 24" O.D.**

See your nearest Tri-Clover Jobber or write for complete details.

Tri-Clover
MACHINE CO.
Kenosha, Wisconsin

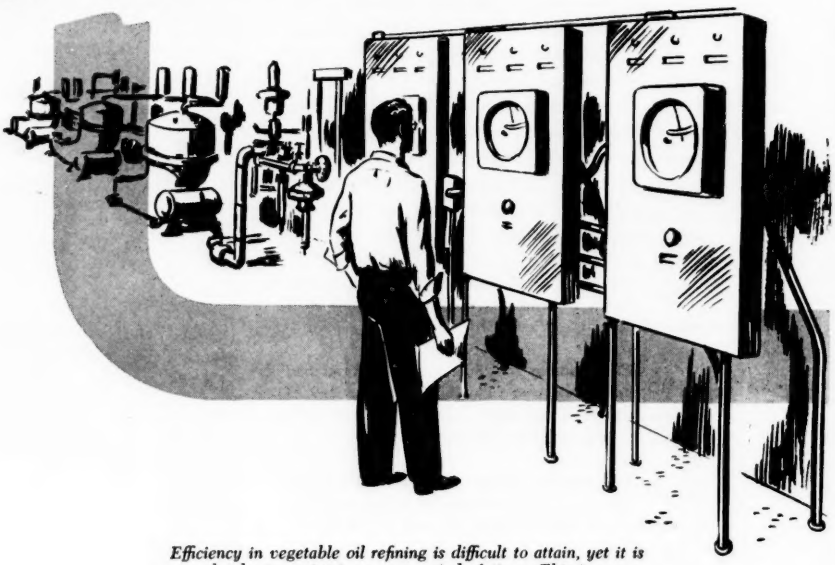
TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE *Complete* LINE

IN VEGETABLE OIL REFINING

—to maintain efficiency is harder than to achieve it . . .



Efficiency in vegetable oil refining is difficult to attain, yet it is even harder to maintain over a period of time. This is an extremely costly factor to the oil industry in terms of man-hours and interrupted production as well as needless oil losses. The Sharples Corporation has overcome this profit-sensitive situation by the development of a highly effective control system—the result of experienced application of control by experienced refinery engineers for over seventeen years.

SHARPLES—CENTRIFUGAL AND PROCESS ENGINEERS

A plant with BRAINS

Ingenious application of control to caustic or soda ash (Clayton) vegetable oil refining processes has appropriately labeled each Sharples installation as "a plant with BRAINS". The term applies far beyond facilitating the achievement of maximum efficiency . . . because the real value of Sharples *Effective Control* is that it maintains this high level of performance at every hour throughout your continuous operations.

Effective Control is a combination of process design factors and the experienced application of control mechanisms wherein all the variable factors affecting each step in the refining process are stabilized . . . yet quickly adjustable for a change from soya bean oil to cotton seed, to peanut or to any other type or quality of oil.

Let's be specific: In caustic refining or in re-refining for color in the soda ash process, good results without saponification of the neutral oils depend on not only the caustic treat, but also precise mixing time and temperature. Effective time and temperature control are integrally designed into the Sharples process; while *Ratio-ed Refining*, a unique Sharples development, actually measures, records and controls the flow of oil and caustic to insure continued maintenance of a positive ratio.

Effective Control of dehydration automatically produces a soapstock which lends itself to ideal centrifugal separation—and minimizes oil losses in the soapstock.

Step by step throughout the entire refining process—whether by the caustic or soda ash method—Sharples *Effective Control* means sustained high efficiency at all times. Sharples engineering of "brains" into the plant has taken the "art" out of vegetable oil refining and reduced it to an everyday profitable routine.

Brains with a PLANT

Installation of a vegetable oil refining process takes more than just equipment built around a flow diagram. It takes vast refining experience to design equipment capable of sustained peak performance. Sharples engineering minimizes troubles in your plant before it is built. And with Sharples it's not just "know-how," it's also "know-do" for Sharples incorporates the greatest accumulation of refining installation experience available anywhere, whether measured in years, number of plants or their combined production capacity.

Plans and layouts are individually prepared for every Sharples installation—utilizing equipment you now have as far as possible . . . but Sharples service does not end here. Sharples engineers supervise installation, train operators, trouble shoot and keep a trained eye on your new plant until it is functioning properly. And that is not all . . . Sharples Nationwide Service is always at your immediate call.

If you refine vegetable oils of any kind, and are contemplating continuous operation by the caustic or soda ash methods, or would like to see the advantages of converting to the soda ash method, don't fail to evaluate the significant advantages of Sharples experience and Sharples engineering for your plant.

An informative new booklet entitled, "Practical Considerations in Vegetable Oil Refining . . . for a profit" *will gladly be sent to you upon request.*

The SHARPLES CORPORATION

NEW YORK 17, N. Y. 501 Fifth Avenue
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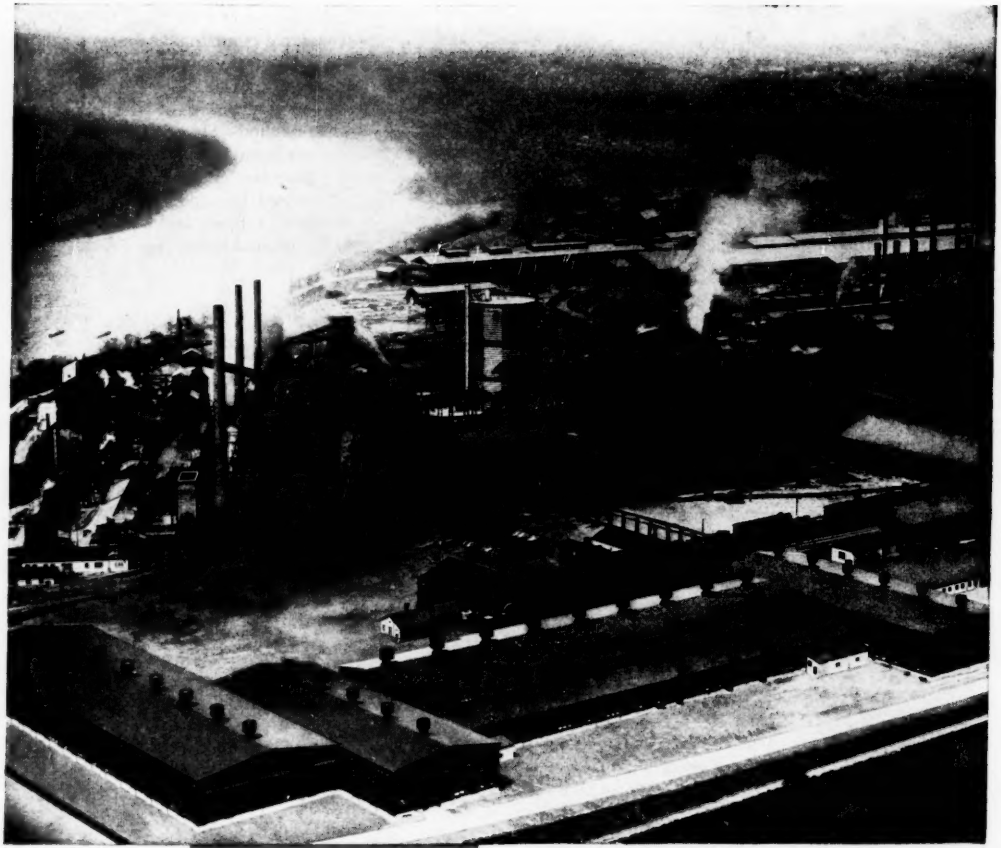
EXECUTIVE OFFICES AND FACTORY, 2300 WESTMORELAND STREET, PHILADELPHIA 40, PENNA.

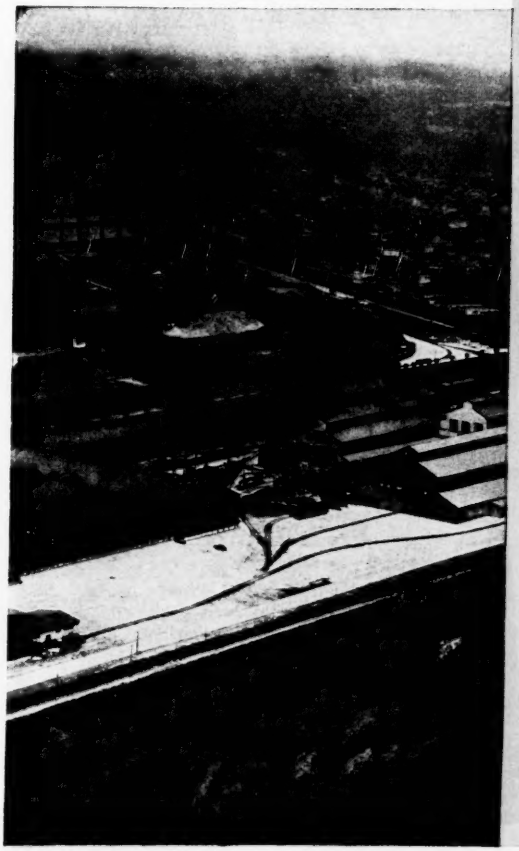
$18,000,000 set of tools for the



CRUCIBLE first name in special purpose steels

hot and cold rolled **STAINLESS SHEET AND STRIP**

MASTER mechanic



When a *master* mechanic gets new tools, expect master workmanship. And when CRUCIBLE, *master* producer of tool, alloy and specialty steels, designs an $18,000,000 mill specifically for hot and cold rolled stainless sheet and strip, you can rightly expect the best that modern facilities and generations of *specialty product* leadership can provide.

For here, at CRUCIBLE'S new Midland Mill, is an entirely new concept in stainless sheet and strip production . . . here, for the first time, stainless sheet and strip are made as *specialty products*, by specialty production methods, in a mill built from the ground up for this purpose. Here at Midland are no mills designed for carbon steel production, re-powered for the heavier duty of rolling stainless, but $18,000,000 worth of *brand new* equipment, designed and built for *modern* hot and cold rolling of stainless steel – in widths from ½" to 50" inclusive, and in all gauges, grades and finishes.

This is important news to every designer and fabricator of stainless steel products. For CRUCIBLE, pioneer in stainless steel since its inception, now offers *a completely integrated* line—sheet, strip, plates, bars, tubing, wire, forgings and castings.

In short, you can turn with every confidence to the *first* name in special purpose steels for *every* form of stainless. One of the largest and most highly specialized technical forces in the steel industry is at your service for specific application advice. And there are comprehensive data sheets available for all grades. Your inquiry will be welcomed.

CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, 405 Lexington Ave., New York 17, N. Y.

Branches, Warehouses, and Distributors in Principal Cities. Consult your Telephone Directory or Thomas' Register for Nearest Office.

HIGH SPEED • TOOL • STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEEL

Why the motor at the bottom of the well?

BJ Submersible Pump

The only basic improvement in deepwell turbine design . . . since Byron Jackson introduced the deepwell turbine pump in 1901.

SHAFTING LENGTH TROUBLES define the "borderline" beyond which the shaft-type deepwell turbine pump cannot be used successfully. That "borderline" is determined by length of shaft alignment.

THE SUBMERSIBLE IS DIFFERENT. Consisting of close-coupled deepwell turbine pump and electric motor, it operates deep down in the well... *entirely submerged in water* at *any* depth. With no long shaft or shaft-bearings to align, it operates equally well 50 feet down or 1500 feet down. Many are operating at depths from 900 to 1000 feet with amazing efficiency and unvarying dependability. And all because a successful means of sealing an electric motor for underwater operation was developed.

Get this new Submersible Bulletin. Write Dept. 310, Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, California.

Byron Jackson Co.

LOS ANGELES 54, CALIFORNIA

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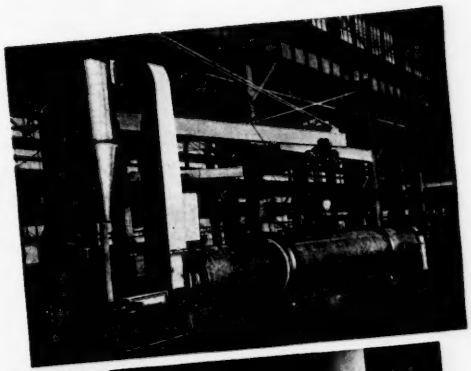
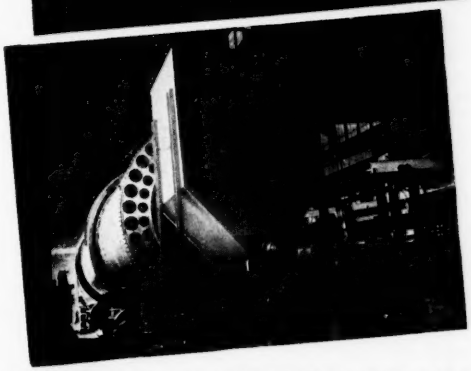
PROFITS FROM DRYERS DON'T "JUST HAPPEN"!





Louisville Dryers have the built-in experience of 56 years devoted to solving drying problems.

This experience covers different industries, many products and various types of dryers such as Rotary Steam Tube, Indirect Steam, Direct Heat, Type "L" (Semi-Indirect Heat), Drum Dryers, Roller Presses, Dewaterers, Coolers, etc.

Sound engineering and design are translated into finished equipment through extensive manufacturing facilities and construction experience. Louisville Dryers are built in modern shops equipped for the fabrication of custom-made unit process equipment from all weldable alloys and steels.

If you have a drying problem, or are contemplating modernization of your present facilities, call upon General American.

OTHER GENERAL AMERICAN EQUIPMENT

Drum Dryers · Thickeners · Roller Presses
Rotary Dryers · Filters · Screw Presses
Turbo-Mixers • Evaporators
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Citrus Process • Malek Rice Process

GENERAL AMERICAN TRANSPORTATION CORPORATION

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WORKS: Sharon, Pa., East Chicago, Ind.

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March 30, 1949
Robert Gair Company, Inc.
155 East 44th St.
New York, 17
Gentlemen:
The members of our organization are happy to extend hearty congratulations to you on the occasion of the 85th anniversary of the founding of your business. For many years you have supplied us with folding cartons, corrugated and solid fibre containers. During all that time your products have been highly satisfactory and our relationship with your Company a very happy one. We have particularly appreciated the benefit we have received from the cooperation of your technical as well as your sales staff.
We hope our pleasant relationship with your Company may continue for many more years.
Cordially yours,
POND'S EXTRACT COMPANY
Chairman of the Board
CMB:m
ROBERT GAIR COMPANY INC. • NEW
PAPERBOARD • FOLDING CARTONS

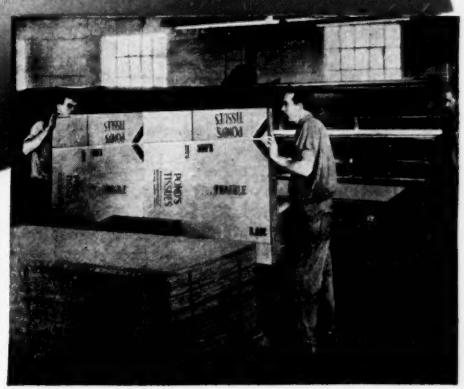
RODUCTS GO TO MARKET

AIR CARTONS

OND'S CREAMS, TISSUES, ANGEL FACE
ND OTHER PRODUCTS HAVE BEEN GOING
O MARKET IN GAIR BOXES FOR YEARS

OND'S is an outstanding name in the Cosmetic and Toilet Goods Industry. illions of dollars have been invested in advertising and merchandising to create -wide consumer demand for POND'S famous products.

RT GAIR ORGANIZATION is proud of the fact that they created designed folding cartons and shipping containers for POND'S and by so elped these famous POND'S products go to Market.



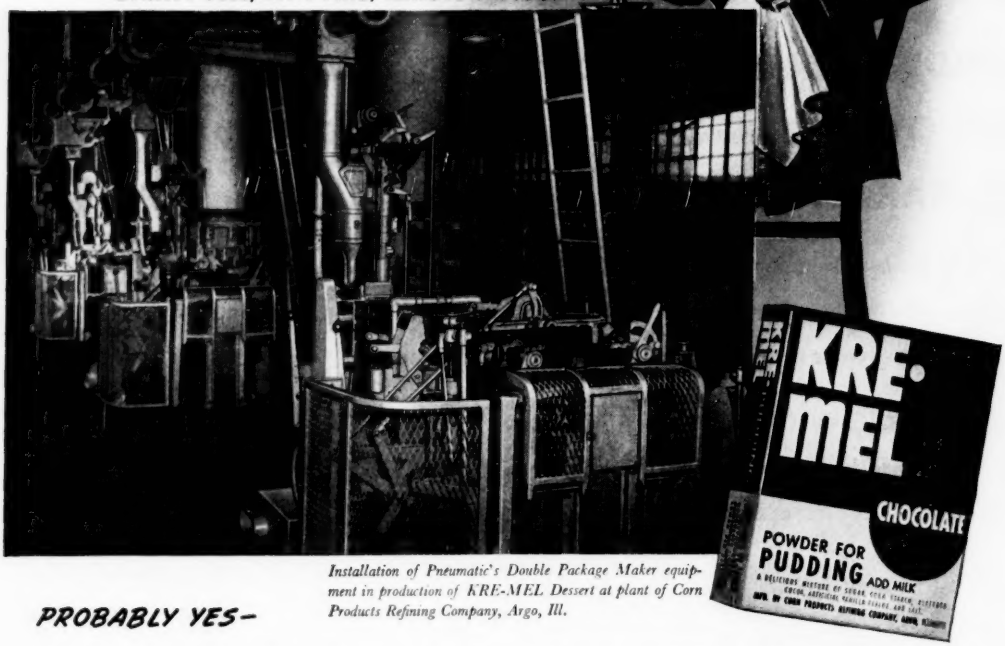
POND'S SHIPPING CONTAINERS are produced in a strategically located Gair Plant.

YORK TORONTO

SHIPPING CONTAINERS

DID PNEUMATIC HAVE A HAND IN YOUR DESSERT LAST NIGHT?

KRE-MEL, TUMBO, CLINTON, AMAZO, KROGER, DAINTY JELL, MY-T-FINE, MINUTE TAPIOCA



Installation of Pneumatic's Double Package Maker equipment in production of KRE-MEL Dessert at plant of Corn Products Refining Company, Argo, Ill.

PROBABLY YES—

because America's leading makers of packaged desserts use Pneumatic Packaging Machines!

And there's good reason why so many famous manufacturers rely on Pneumatic Packaging Machines. They've found that the sturdier construction, the precision engineering of Pneumatic Machines assure them of speedier, lower-cost package output!

Pneumatic's Double Package Maker, for instance, forms a protective lining and then shapes a carton around it. The snug-fitting inner bag allows maximum fill, offers far greater product protection.

That's just one example of Pneumatic's packaging efficiency and convenience. In a half-century of highly specialized operations, Pneumatic research has developed more than ninety different machines to handle your packaging and bottling needs, speedily, competently . . . to give you Pneumatic's famous "lower cost per container" performance!

★ ★ ★

PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Ave., Quincy 71, Mass. Branch Offices in New York, New York; Chicago, Illinios; San Francisco and Los Angeles, California; Seattle, Washington.

PNEUMATIC

PACKAGING AND BOTTLING MACHINERY

HERE'S WHAT REPUBLIC DISTRIBUTORS DO FOR YOU

Irvin Reed, Manager
Pacific Coast Rubber Company
51 Main Street
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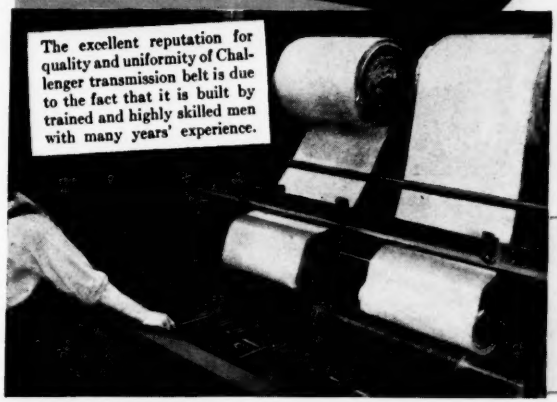
CHALLENGER TRANSMISSION BELTING is tan in color with purple edges to identify it as a top performer on general services and heavy industrial drives under severe shocks and stresses. It has minimum stretch and freedom from fastner trouble. Made of heavy hard-woven fabric . . . (built and vulcanized under laboratory control).

How to avoid high cost when selecting transmission belting

★ Your distributor of industrial supplies will tell you that Challenger belting is breaking records on all types of industrial transmission drives.

There are no costly shut-downs due to application of the wrong type of belt. Experienced distributors such as Mr. Irvin Reed (pictured above) can help you choose the grade and type belting which will serve you best. And, there is a national network of Republic distributors to serve industry everywhere. If you feel you should be getting longer life from your belting, consult your telephone directory for the name of your Republic distributor, write or mail the coupon.



The excellent reputation for quality and uniformity of Challenger transmission belt is due to the fact that it is built by trained and highly skilled men with many years' experience.

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Lee Rubber & Tire Corporation, Youngstown, Ohio
Lee Deluxe Tires & Tubes — Conshohocken, Pa.

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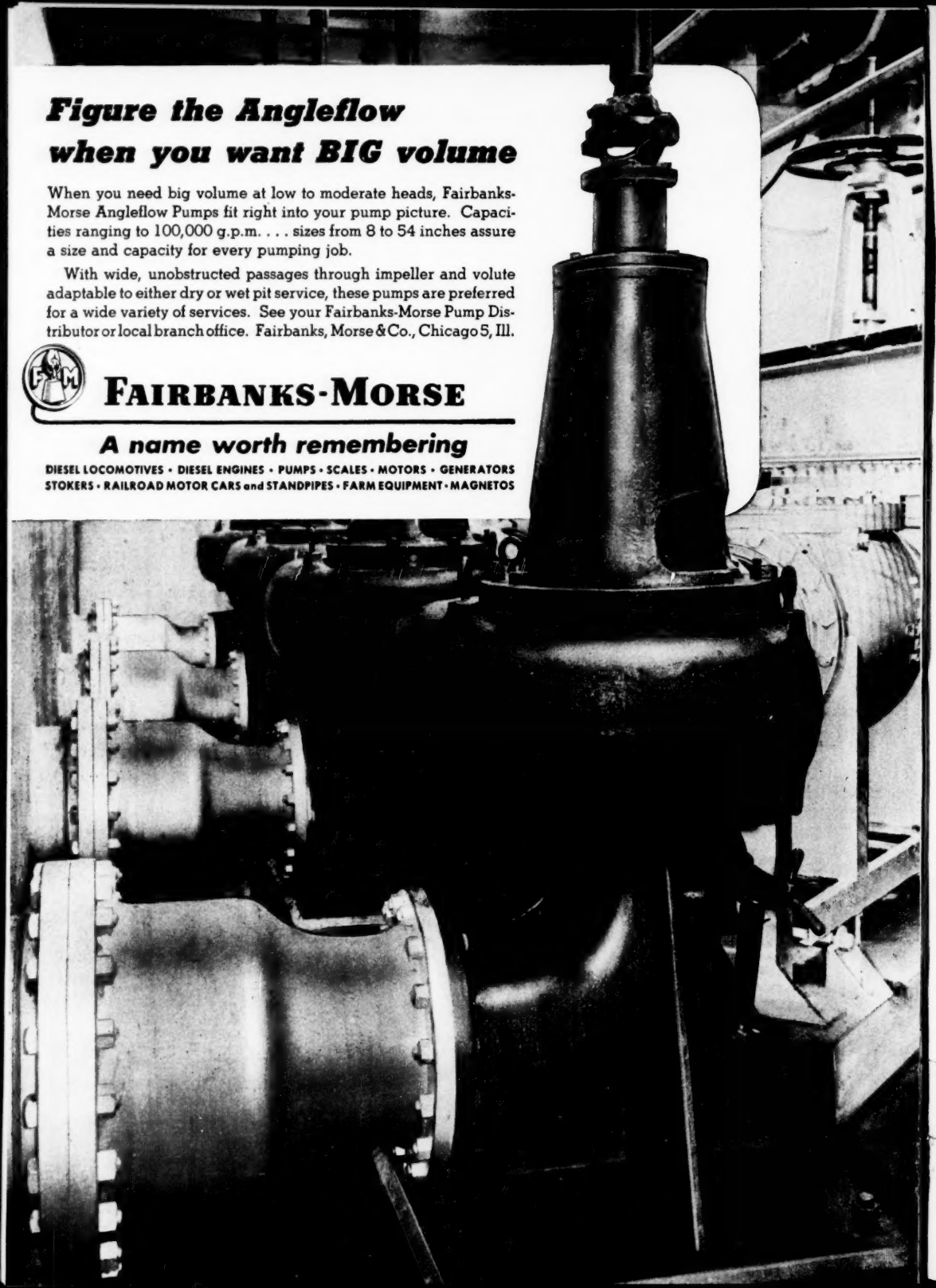


Figure the Angleflow when you want BIG volume

When you need big volume at low to moderate heads, Fairbanks-Morse Angleflow Pumps fit right into your pump picture. Capacities ranging to 100,000 g.p.m. . . . sizes from 8 to 54 inches assure a size and capacity for every pumping job.

With wide, unobstructed passages through impeller and volute adaptable to either dry or wet pit service, these pumps are preferred for a wide variety of services. See your Fairbanks-Morse Pump Distributor or local branch office. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS
STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

Dayton V-Belts
DRIVE-PROVED
TO CUT
Maintenance Costs
Dayton V-Belts have driven this huge asphalt mixing machine for 16 years, without a single V-Belt failure!

...and they are as near as your phone!

Eliminate ruined bearings, burned out motors and drive failures. Add years to equipment life—reduce maintenance with Dayton V-Belts. For Dayton V-Belts are *Drive Proved* to save you money.

In thousands of plants, under every conceivable operating condition, they have proved their ability ... to transmit full power with little or no loss... prevent motor overloads because they won't slip or stall . . . cushion bearings by absorbing shock loads. And they wear and wear, despite abrasive conditions, moisture, heat or cold.

There is a Dayton Distributor near you, ready to equip your plant with Dayton Drive Proved V-Belts and Pulleys. He has the specialized knowledge to recommend the right drive for your plant. If it's an unusual application, he has the resources of the entire Dayton organization to call on.

You'll find him listed in the classified section of your telephone directory under "Dayton V-Belts", or his representative is calling at your plant now.

Get in touch with him. See how Dayton Drive Proved V-Belts can save you money, in maintenance, long life, more efficient drives. *The Dayton Rubber Company, Dayton 1, Ohio.*

ONLY Dayton V-Belts are DRIVE PROVED for the Job!

Dayton Thorobred—for normal and heavy duty drives.
Dayton FHP—for small machines and appliances.
Dayton Cog—for shortest centers, smallest pulleys.
Dayton Steel Cable—for extreme loads and speeds.

ALL STOCKED BY YOUR LOCAL DAYTON V-BELT DISTRIBUTOR

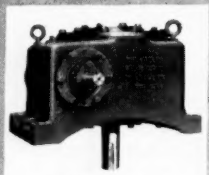
Dayton Rubber

IT PAYS TO MAKE "ONE MANUFACTURER"

RESPONSIBLE FOR ALL YOUR GEARS AND SPEED REDUCERS

PHILLIE GEAR

Herringbone Reducer


Vertical Worm Reducer

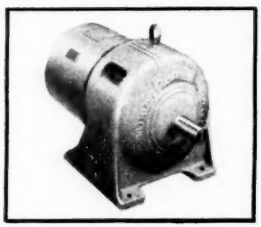
Worm Reducer

Limitorque Valve Operator

We design and manufacture *"every type and size"* of Gear and Speed Reducer . . . This fact is *important* because: (1) It assures the purchaser of our "unbiased" recommendations; (2) Permits ordering from "one source" of supply; (3) Enables the purchaser to place the *responsibility* for the operation of their Gears and Speed Reducers upon the shoulders of "one manufacturer."

Your inquiries are invited for information on any type of Gear or Gear Driven Product which includes the widely used *"Limitorque" Motor-Operated Valve Control.*

Send for catalog on any product, and please use your Business Letterhead when requesting same.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Continuous Tooth Herringbones up to 60" diameter. Separated Tooth Gears up to 150" diameter.

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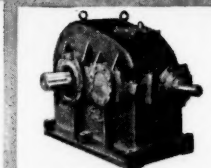
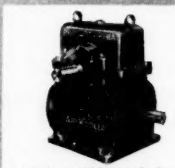
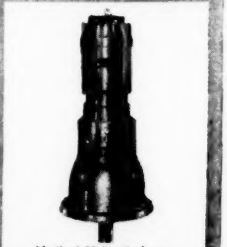
Spur Gears up to 150" diameter. Larger Gears in bolted sections.


Spiral-Bevel Reducer

Planetary Reducer


"AirKooled" Worm Reducer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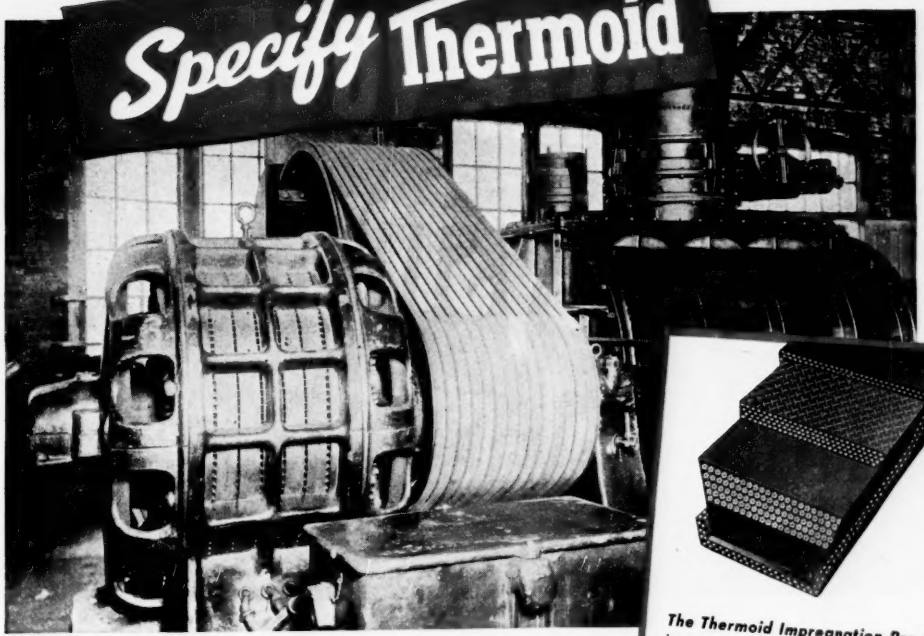
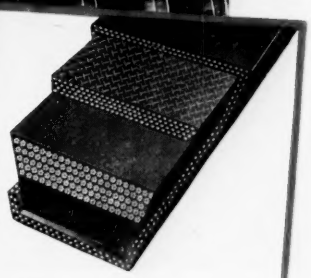
Specify Thermoid





Thermoid Impregnation Process Assures Longer V-Belt Life

Thermoid V-Belts are built to withstand excess moisture—abrasion—acidity—all those elements that hasten belt deterioration. All Thermoid V-Belts are built for the job . . . from the smallest fractional horsepower size up to the largest multiple V-Belt. Each belt is specifically designed and pre-stretched to transmit maximum power without slippage, to absorb repeated shock loads; and to provide smooth, efficient performance at the *lowest* possible cost per hour.

A complete range of sizes are available to meet your requirements.

For quick service call the nearest Thermoid distributor. Thermoid sales engineers are available for advice on special problems.

It will pay you to ***Specify*** Thermoid!

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

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Industrial Rubber Products • Friction Materials • Oil Field Products

modernize your power system the load-center way

—for better power utilization today, lower-cost expansion tomorrow!

To help offset today's squeeze on food processing profits, load-center power distribution can bring you cost-saving features that mean plenty. This modern method of distributing incoming power—at high voltage from a master unit substation to small unit substations located in the heart of load areas—offers you:

High equipment efficiency. You eliminate excessive voltage drop caused by long low-voltage feeder runs—voltage drop that slows down conveyors, dims lights, reduces oven heat.

Ease of change and expansion. You can shift processing lines, or add new ones, without being tied down by an inflexible power system. And unit substations are easy to move, if your plant must be relocated or rearranged.

Personnel safety. All equipment is metal-enclosed and effectively grounded, with no exposed parts to create a hazard.

Reduced maintenance costs. There are no exposed, dust-catching cables or devices to require frequent cleaning and servicing.

Space-saving compactness. Unit substations take up less space than separate components. With no special protection needed, they can go anywhere near load centers—along walls, in basements, on balconies, or roofs.

Easy installation. Factory-assembled and tested, unit substations come ready to install without delay. And generally, an installed General Electric load-center system costs less than older, piecemeal methods!

If you're planning to put in a new power system, or modernize an existing one, why not consult a General Electric application engineer? Familiar with food processing needs, he'll gladly work with you on a one-line diagram as a first step. Meanwhile, send for illustrated booklet, "What load-center power distribution can do for you." *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

POWER DISTRIBUTION SYSTEMS FOR FOOD PLANTS

GENERAL ELECTRIC

Placed close to loads, unit substations eliminate the 10-20% voltage drop common to long, low-voltage feeders. In this Midwest beet sugar plant, a G-E unit substation supplies power for controlling diffuser, washer house, beet receiving area, and pulp drying equipment.

Compact and space-saving, unit substations come ready for quick, inexpensive installation. Here, another G-E unit substation supplies power to centrifugals, granulators, and other dry sugar machines.

SEE THIS FILM!

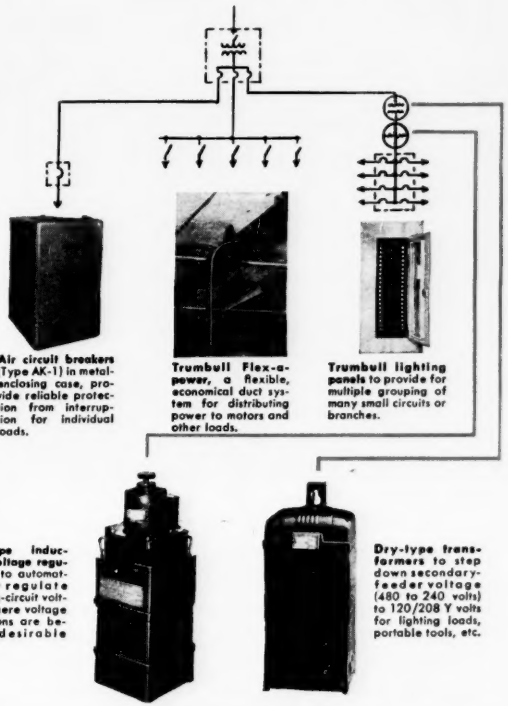
A G-E color sound slidefilm, "Modern Industrial Power Distribution," presents the whole story on load-center distribution. Ask your nearest G-E office about showing it to your personnel.

More Power to America

WHEN YOU GO "LOAD CENTER" GO GENERAL ELECTRIC *ALL THE WAY*

Complete General Electric load-center unit substations for food plants include a metal-clad incoming-line section with magne-blast power circuit breakers, a Pyranol transformer section, a low-voltage feeder section with drawout air circuit breakers, current transformers, buses, protective and disconnecting devices—all co-ordinated into one compact, easy-to-install unit.

In addition, the following associated equipment for load-center systems can also be provided by General Electric where desired—to make it G-E all the way:



Air circuit breakers (Type AK-1) in metal-enclosing case, provide reliable protection from interruption for individual loads.

Trumbull Flex-a-power, a flexible, economical duct system for distributing power to motors and other loads.

Trumbull lighting panels to provide for multiple grouping of many small circuits or branches.

Dry-type induction voltage regulators to automatically regulate lighting-circuit voltage where voltage variations are beyond desirable limits.

Dry-type transformers to step down secondary feeder voltage (480 to 240 volts) to 120/208 Y volts for lighting loads, portable tools, etc.

WANT MORE DATA?

General Electric Company, Section B652-1
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

- ☐ GEA-3758—Load-center power distribution
- ☐ GEA-4322—Electric equipment for the food industry

Name.....

Company.....

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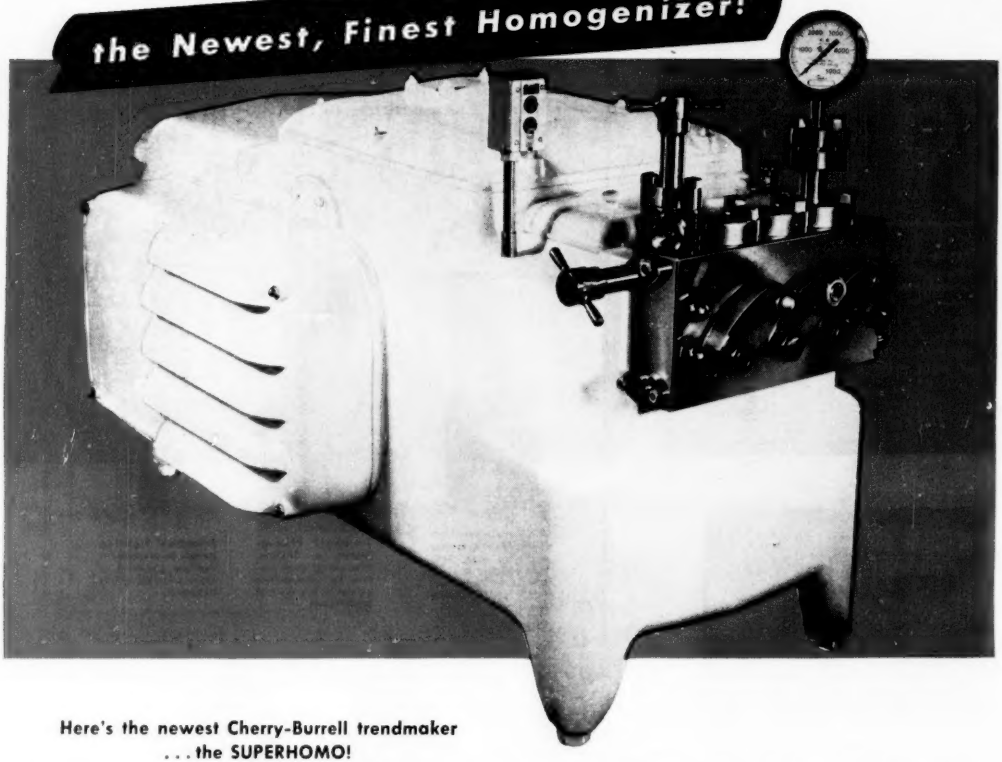
the Newest, Finest Homogenizer!



Here's the newest Cherry-Burrell trendmaker ... the SUPERHOMO!

Embodied in the new, most sanitary SUPERHOMO are the greatest advancements of design, construction and operation. And these advancements, these features, have made SUPERHOMO the recognized leader in the homogenizer field.

Some outstanding features of the SUPERHOMO include: the simple, efficient, single or two-stage homogenizing valve ... the most sanitary, economical, easy-to-assemble and disassemble solid stainless steel cylinder block ... and the most rugged, compact, easy-to-clean frame and drive mechanism, the easiest to service of any homogenizer available.

But, find out for yourself what makes the new SUPERHOMO the finest homogenizer ever built. Send the coupon below for the SUPERHOMO bulletin!

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"Give us the tools . . ."

The 81st Congress Can Halt the Administration's *SOCIALIST PROGRAM*

In his speech at Massachusetts Institute of Technology, Winston Churchill said that America's possession of the atomic bomb is all that has kept Soviet Russia from overrunning Europe and bombing London.

Our State Department knows that there has been another deterrent to aggressive warfare by Russia and a deciding one. That deterrent is the superior industrial strength of the United States. But once Russia approaches our industrial strength, then watch out! For Stalin or no Stalin, there will be trouble. Therefore, the simple table below is worth every American's careful reading. It shows in percentages what Russia did with her national income in 1948 and what we did with ours:

	USSR	USA
Civilian use	60%	79%
New capital equipment and public works	21%	12%
Foreign aid		2%
Defense	13%	5%
Building of inventories and war stock-piling	6%	2%

These figures for Russia come from *The* (London) *Economist,* Britain's influential economic journal.

These figures are estimates based on information from behind the Iron Curtain, and so cannot be checked directly. But they fit with what is known of Russian development.

The table shows that Russia is straining every resource to build up its industrial strength. When Russia's effort is measured in *dollars,* and compared to ours, the figures show:

Where we spent $20 to $21 billion for new industrial plants and equipment last year, the Russians spent $12 to $14 billion.

But while we used about $9 billion of this to *replace* old equipment, the Russians spent no more than $2 billion for replacing old equipment. The Russians had much less worn-out and obsolete equipment to replace. They could concentrate their efforts on expanding their industries and buying new equipment.

So—we used only $11 to $12 billion to *expand* our industries.

And the Russians used almost as much to expand theirs—$10 to $12 billion.

Russia is gaining industrial strength as fast as we are—and may soon be gaining faster. The more she gains and the faster she gains on us, the greater is the danger of war.

continued on next page

American industry is pushing modernization and expansion hard. It is doing an heroic job. McGraw-Hill's recent survey* shows that *industry* already has in hand plans to build plants and buy equipment in the next five years adding up to $55 billion. Industry plans that investment—*and much more—if it can get the money.*

On those plans of *industry* depend *our* national security.

If these plans of ours are cut back, the Russians will be years closer to their goal of industrial equality—the strength that they need to wage aggressive war successfully.

But more and more our industry's plans are being menaced by socialist policies in Washington. The President continues to urge a further increase in the tax on corporate profits, even though federal taxes alone now take 38 cents of every dollar of profit. He wants $3 billion more in taxes on corporate profits now, plus added personal taxes.

Last year corporations spent almost two-thirds of their profits—about $13 billion—for new plant and equipment. This year corporation profits will be lower than last year's $21 billion, perhaps by 20 per cent. Subtract a fifth or more from last year's profits. Then adopt the President's proposal and take $3 billion more in corporate taxes and you raise havoc with planned expenditures for new plant and equipment.

Approval by Congress of the President's tax program would cut industry's program of plant and equipment development by a third or more. That means a major blow to our prosperity as well as our national security. For as capital investment goes, so goes general prosperity.

Further serious damage would be done by Congressional approval of the President's industry-control bill. The so-called Stability Act of 1949 (the Spence Bill) would severely check industrial progress. That bill would put the federal government in the business of providing the added industrial capacity which the tax program would prevent private industry from doing for itself. It would be hard to conceive a better and surer way to dry up private investment in new plant and equipment. For every dollar of government investment will scare away many times more dollars of private investment. People will not want to risk their money in businesses competing with the U. S. Treasury. At the same time it will attack private investment in another way. It means that government would spend your income for you instead of allowing you to spend or invest for yourself. That is the high and quick road to socialism.

American industry needs right now great courage and incentives if it is to carry out its tremendous building program. It needs also a release from the program of a socialist administration in Washington with its systematic discouragement of enterprise and risk taking.

Above all, industry needs assurance by the actions of the 81st Congress itself that there is a future in this country for a system of dynamic capitalism, functioning in a free society. By acting now to strengthen the American people's faith in their industrial system, by providing needed incentives for management and investors, by protecting industry's capacity to buy new equipment, the 81st Congress can sustain American industrial progress and keep us united and strong.

But if we kill freedom of industrial planning and action by unneeded taxes and government controls we put ourselves—and our friends all over the world—in dire peril.

Nothing would please the Communists more.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

***A complete report on our national survey may be obtained by writing McGraw-Hill Publishing Co., 330 West 42nd St., New York 18, N. Y. This is one of a special series of editorials on industry's needs for new plants and equipment.**

Food Industries

These Eight Factors Will Influence Business Trends

What's ahead for business? That question seems to be on the mind of every business executive whether he utters it publicly or not.

While it is not necessary to add another voice to the clamorous predictions by those whose business it is to predict, there are a few points which deserve emphasis but which we sometimes forget in making our own private decisions.

1 It is a very old adage that what goes up must come down. Meaning prices, of course, in this instance.

2 As Alonzo E. Taylor, of General Mills, Inc., said years ago, it is comparatively easy to climb up to a plateau of high prices, but climbing down (usually tumbling down) is a painful process.

3 Americans have been yelling for production large enough to stop inflation. Well, here it is. Nearly all pipelines are full. But why don't we enjoy our plenty? The answer is easy: In the past 300 years, the U. S. A. has been the gathering place for unsatisfied people. This nation would never have achieved its present status if we had been a nation of easy-going, easily satisfied people. We like change. We demand change. And having achieved a change, we don't want it. We want still more change.

4 If the prices received by farmers fall materially, the money they can spend for things made in cities is bound to be lessened. Incidentally, farm price-support programs without farm production control are the bunk; *e.g.*, eggs and potatoes in 1948. Without production control, price-support programs are largely paid by city folks' taxes—and they have to pay the pegged price as well.

5 Whatever direction prices take—either up, down or on a level—don't forget that: 1. We have a greatly increased population since 1939. 2. These people are all descendents of the typical unsatisfied Americans mentioned before. 3. People are going to continue to eat, marry and have children.

6 Debt, be it private or corporate, is a chain to the post. And the loudest complaints about adapting ourselves to change will come from those whose debts were contracted at higher prices.

7 Nearly all the professional predictors and viewers-with-alarm omit from their calculations what seems to us to be a very potent factor for evaluating the future. This is what we shall momentarily call "economic tinkering" by organized labor. For it must not be lost to sight that union labor finds climbing down off the high price and wage plateau just as painful a process as it is for business management. There is this difference, however: The unions believe they can do more about it than management.

Thus, as long as organized labor holds to the theory that it can avoid or postpone the descent from the inflationary plateau—or cushion the fall by increasing the buying power of this important segment of the population—we shall see some large-scale attempts to prove the theory. Witness the recent demands for wage increases at a time when prices are softening. Strikes can empty the pipelines even if the wage increases are not won.

8 The enormous size of our national debt guarantees two things: 1. Economic change. 2. A turnover of money that makes the early New Deal pump priming puny by comparison.

Who gets the interest? People. Who pays it? People. Result—spending power transferred. How does that differ from the old New Deal?

What all this portends for the future we can only guess. Change is always painful to those who will not, or cannot, accept it.

For the individual person or corporation, some of the changes ahead may be very painful. For the nation as a whole, the internal picture does not look bad at all. The times call for broad-gage thinking and logical analysis and adaptability. We can meet change head on and get a battered countenance, or we can roll with the punch. It depends upon our state of mind.

—**L. V. BURTON**, *Consulting Editor*

The Talk of the Industry

Price-Tag Psychology Reappears

Psychology like heredity seems to be an attribute of humanity that will never change. Now that competitive selling is reappearing after an absence of many years, the psychology of price figures likewise reappears. And with it comes the smaller package, the smaller container or the smaller case. Though these smaller packages contain less food and more package than the larger ones, and hence are less economical to buy, that's the way the trend will go.

Any manufacturer will gladly comply with a well-established demand, even though he may smile indulgently at the housewife's false economy.

Cheaper Distribution May Boost Frozen Foods

Experiments are being conducted, in the distribution of frozen foods, which may give that industry added impetus. We refer to the elimination of the exclusive distributor and the channeling of frozen foods through wholesale grocers, the processors carrying warehouse stocks in key markets. The products would be delivered by the case on wholesalers' trucks, in insulated containers or compartments.

It is claimed that this method of distribution will cut the price to the consumer 10 to 15 percent. If this be true—and if delivery to retailers is fast enough to prevent partial thawing—this method of distribution could greatly broaden the market for frozen foods. We say this because a recent survey reveals that "too expensive" is the reason given by 30 percent of nonbuyers of frozen foods.

A nice business can be built on quality. But the mass market calls for quality at a competitive price.

Efficiency Experts Are Good, But . . .

It's gratifying to learn that what every factory manager or superintendent knows is finally becoming recognized as the truth.

For a great many years, the notion has existed that the outsider is the boy who can really introduce the production economies. To be sure, he can often spot the places for potential savings, but the man on the job is really the best man to put them into effect.

During the recent Time Study & Methods Conference—jointly sponsored by the Society for the Advancement of Management and the Management Division of ASME—it was clearly brought out that the real problem is to instill employees with the desire to increase work output. This can be done by removing causes of fear of rate cuts or other sources of insecurity.

As far back as we can remember it has always been that way.

Where Sterilization by Electrons Stands Today

There has been much talk in the industry lately about the possibility of sterilizing foods by electron bombardment. This stems from experimental work done with the capacitron, which discharges electrons in pulses at two or three million volts potential. The food so treated has been sealed previous to bombardment in airtight plastic capsules.

We have talked to leading food technologists about the possibilities of this revolutionary method of "cold" sterilization. None has any more definite information than what you may have read in popular magazines. More than two years ago, a technical paper was published on the electronic features of the capacitron, from which one may conclude that it is sound electronically. And the people who developed the method—incidentally, they have solid reputations as electronics engineers—make no final claims as to the commercial practicability of the process in the food industries.

They have conducted some experiments which gave surprising results, and they expect to find out a lot more in the next few months from the operation of a pilot plant. Some large food companies are reported to be interested, but they have not been named. And that is where this interesting development stands at the moment.

Electron bombardment is worth watching, because experiments at MIT indicate that sterilization of foods by cathode rays (electron beams) may be commercially feasible. More work is being done on this to better evaluate the possibilities.

But two basically important questions must be answered before sterilization by X-rays, cathode rays, or electron bombardment can be sized up. First, can these methods compete with present methods on a cost basis? Secondly, do the rays or electrons impair the nutritional and physical qualities of the product?

Who can say? Revolutionary methods may lie ahead.

Hors d'Oeuvres

■ *Business Week* points to a new colloquialism creeping up on us. Used to describe President Truman's Point 4, the term is "'show-how' taken from 'know-how.'" We hope and trust the application is in that order, too.

■ Citing the 55-gal.-per-capita consumption of coffee and the 19-gal.-ditto of beer in this country in 1947, a promoter for the bottlers points to the 12-gal. of soft drinks used up per person. He thinks "there are still many people left to be converted to soft drinks." Couldn't we just promise to increase our soft drink intake and be spared the conversion?

■ An Ostersund, Sweden, brewery got tired hauling in heavy cylinders of carbon dioxide. So, it says here, they devised a means of utilizing the CO_2 from the smoke of local factory chimneys. Must be a deuce of a job on windy days.

■ We have been laboring over Secretary Brannan's arguments as to why farmers should be supported at a postwar level to which they were previously unaccustomed. And just as a precaution, we think maybe our economy, which has shifted from agriculture to industry, had better start looking around for a way to shift back.

■ Dutch breweries are said to be in serious straits. Declining export trade is one cause. Another is the drop in home consumption due to fierce competition by gin. If you find yourself stocked with prewar impressions of the Dutch, you might as well unload.

■ *Farm Journal* tells about the westward trek of the peanut belt. Texas is now the second largest producer, and Arizona plantings are extensive. "All the Arizona peanuts," it says, "are irrigated." Up to now, homogenization was the best they could do to prevent peanut butter from drying out.

J.A.J.J.

PROCESSING begins in the field for John Morrell & Co. Even a loud speaker was used on this Kansas tour.

What It Takes to Reap Good Grower-Relations

Effective programs are being adopted by both large and small manufacturers to highlight common interests of all concerned in food production

DAVE THOMPSON
Agricultural Consultant,
Grocery Manufacturers of America, New York City

In any consideration of processor-grower relations, one should first examine the split of the retail dollar. Bankrupt farmers in the early 30's received less than 30c. of the retail dollar. And at the close of World War II, farmers, with the largest income in history, received about 57c. of the retail dollar.

Today, the retail food dollar is split about in the middle, with 50c. going to farmers and 50c. to those who operate in the life line of America between farmers and consumers. With prices of farm products declining, it is probable that the farmer's share of the retail dollar will decrease.

After World War I, bitterness often developed between farmers and food processors as a result of economic loss, which few could understand, none prevent. Since then, both farmers and food processors have learned that they are in the same boat. Their fortunes are good or bad together. They recognize food production as a continuing process, starting at the farm and going through the factory. They know that food processors, wholesalers, and retailers, are really salesmen of raw farm products.

Seek Mutual Understanding

An encouraging development during World War II and in the years since its close, is the sincere desire of both processor and farmer for a clear understanding of mutual problems. Farm organizations have developed public relations work to tell their story to industry and consumers. The food industry has long maintained farm relations programs. During many years the industry has discovered ways of working with individual farmers and with farm groups.

Small food processing plants operating in a local area can use most of the technics which large companies have found useful. The fact is that large food processing companies frequently are entirely local at the processing point. A large company may have its processing plants at numerous places, located where plant managers and fieldmen have daily contact with growers. From the experience of many member-companies of Grocery Manufacturers of America is drawn the accompanying 14-point program for successful farm relation technics (see box titled "Do" Points for Processors).

John Morrell & Co., meat packer operating in Iowa and the Dakotas, has company farm relations men meeting with farm groups constantly. To assist others in their meetings, this packer has a mobile public address system available for any farm gatherings in the territory. It is booked up solid. Promoting its educational campaigns in livestock production, the company stages many meetings in which its buyers work with state extension personnel in teaching live and dressed grades of lambs, hogs, and beef cattle.

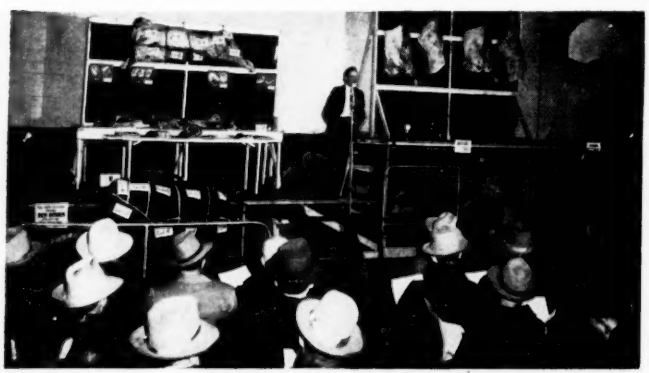
Kraft Foods Co., operating many

"DO" POINTS FOR PROCESSORS

1. **Take part in meetings with farmer groups.**
2. **Employ fieldmen qualified to be farm advisers, and train them in significance of good farm relations.**
3. **Work out contract specifications with committee of growers.**
4. **Work with growers in developing new crops and uses for old crops.**
5. **Sponsor quality improvement programs through plant inspection, farm demonstrations, contests, industry motion pictures.**
6. **Support Future Farmers of America and 4-H Club Activities with funds and personal services.**
7. **Distribute economic information about supplies, possible markets, and prospects for raw farm products, working with county agents, vocational agriculture teachers, college and farm bureaus, and other educational groups.**
8. **Conduct essay contests on subject of how your factory and its growers depend upon each other and how the community depends upon both.**
9. **Join with farmers, wholesalers and retailers in exhibits at county fairs or other farm meetings, showing movement of food from field to table.**
10. **Hold open-house days at your plant.**
11. **Work with newspaper editors and radio farm directors to tell your story of farm relations.**
12. **Use newspaper advertising for public relations purposes.**
13. **Keep businessmen in your town posted as to conditions in your business, especially as they affect probable payments to farmers and payroll increases and deductions.**
14. **Be a good citizen by taking active part in civic and rural enterprises.**

FOURTEEN points author calls essential for processor in grower relations.

GOODWILL and a great deal of "know-how" were developed through Gerber Products Co.'s Grading School, sponsored by Michigan State Canners.



BEEF CATTLE FIELD DAY, another feature of Morrell company program, attracted more than 600 farmers from a wide surrounding area.

dairy manufacturing plants throughout the country, has in recent years changed the type of its fieldmen, who now must qualify as competent farm advisers. Company fieldmen conducted a promotional drive in Wisconsin on Ladino Clover that resulted in greatly increased acreage and an improvement in milk production.

In Missouri, a five-year project was brought to a successful climax, in 1948, when 5,000 people saw a typical Ozarks hill farm made into a highly productive dairying operation through practices recommended by the Missouri Extension Service and promoted by Kraft fieldmen. The fieldman's work extends to the entire community, as well as to company patrons. GI on-the-job farm trainees, vocational agricultural students and others frequently are recipients of aid and counsel from him.

It has been usual for attorneys for canning companies to draft growers' contracts with an eye toward company protection rather than good grower relations. Last year, the Association of Growers in Wisconsin prepared its own contract. And the Wisconsin Canners Association is working with the growers with the purpose of preventing ill feeling such as often arises because of one-sided contracts.

Birds Eye-Snider Division of General Foods, Curtice Brothers Co., and others in New York, are working with individual growers and with the Association of New York State Canners on improving contracts. Certainly a plant operator, who lives close to his growers, will find his relations with them improved by use of contracts mutually agreed upon.

Often, processing plants are located in areas suited to particular crops. In regions of Maine, wild blueberries develop delicious flavors. Accordingly, Burnham & Morrill last summer operated a pilot plant in that area working with growers in developing ways of packing, cleaning and grading. The objective was to pack wild Maine blueberries in 20 lb. cans for quick freezing. The market for this would be pie factories baking for hotel and restaurant trade. This is an illustration of a considerable stream of cash coming back to the community because both growers and processors worked together in finding a way to market this crop.

From educational campaigns conducted by food processors, farmers have learned that quality, markets production methods, and prices all work together for greater cash income. In reply to a recent inquiry by GMA, 74 percent of Farm Panel of America members attested to the help received through educational campaigns. These campaigns may be local or nation-wide.

Pillsbury Mills for years has con-

ducted a wheat-improvement contest. Twenty-one wheat growing states participated in the competition for the 1948 crop year. This is but one of the many contests sponsored by this milling company. Though conducted on a national basis, it also evidences the value of local contests.

Support of local Future Farmers of America and 4-H Club activities through funds and services is the usual practice in every community. General Mills has done nationally what most local food processors do in their home towns. This company has written and printed numerous booklets. More than 2,000,000 copies have been distributed for use of vocational agricultural teachers and county 4-H Club leaders.

Better farm relations are enjoyed when growers know the economic facts that influence the sale of food products made from their crops. P. J. Ritter Co., Campbell Soup Co., H. J. Heinz Co., and other tomato processors in New Jersey, had an unhappy experience two years ago with Jersey growers. But these companies are now cooperating with the Growers Association and Rutgers University in preparing and publicizing economic information about tomatoes and tomato products. All factors influencing prices and acreage have been analyzed, and the data are available to all growers.

This is much more satisfactory than arriving at price and tonnage contracts by bickering and name calling. Similarly, a small processor has many such facts available to him about his business. He will do well to share them with growers.

Sponsor Contests

The essential processes between food in the field and food on the table can be well highlighted by the local processor who sponsors an essay contest for members of all youth organizations. The 4-H Clubs, Future Farmers of America, Boy and Girl Scouts, school classes, and others, can take part. This kind of contest creates a world of publicity.

GMA has just recently announced its second Annual Life Line of America Trophy Award for home editors of farm papers and newspapers and home program directors of radio stations. A great amount of writing talent, space in papers, and time on the air has resulted. Local essays can be devoted to the subject of how a factory and its growers depend upon each other and how the business of the community and the welfare of its families depend upon both.

At the Eastern States Exposition there was an exhibit showing raw farm products and manufactured products on their way from the farm through the factory, the wholesalers and retailers, to the consumers. It illustrated the Life Line of America. Any local factory can join with farmers and retailers in making a similar exhibit at the county fair and other gatherings of the community. Such displays can be just as useful in schools, churches, or other civic gathering places, as in farm meetings. All of the materials are at hand; and most important, all of the primarily interested people are available to do the work of preparation and display.

An invitation to farmers and city folks to attend Open House Day at a food processing plant is usually welcome. Packing companies, dairy manufacturers, millers, and other food processors, conduct regular tours of their plants, with trained guides in charge of groups.

The Kellogg Co., at its Michigan cereal factory, has open house daily. More than 20,000 guests per month see the machine operations that transform the cereal grains into breakfast cereals. It has become a matter of pride as well as business for the company to entertain these guests. An equally friendly gesture, though smaller in scale, can be made by any food processing plant.

Food Production Is News

In the hurry and scurry of everyday business, the plant owner or manager may fail to see the news-worthiness of the activities in his plant. Many plants are located in cities where the daily paper has a farm page editor or the local radio station has a radio farm director. Usually these men and women are eager for news that effects the economic welfare of their communities. Nothing in season is more significant than the harvesting and processing of food crops. One of the major farm relations activities of GMA is preparation of timely releases to these people in farm publicity work. They give us nationally the same enthusiastic cooperation that is available locally to the home food processing plant manager.

Occasionally, there is need for a food processing plant to tell its story effectively to the public. Many plants have used local newspaper advertising and radio interviews. Perhaps the biggest program of farm relations advertising in America is done by Agricultural Research, Swift & Co. Informative advertising has appeared in all leading farm and livestock journals and country newspapers since December, 1944. It gives valuable information to agricultural producers about new developments in their business. It talks freely about livestock prices and profits in the meat packing industry. It gives facts about the spread between the prices producers receive for their products and what consumers pay.

While this advertising covers the nation with full-page copy in the farm and rural areas, an equally impressive job can be done locally by a food processing company with a monthly message in paid advertising space in the local newspapers. Copy does not need to be elaborate. Most effective is a simple statement of facts—in plain, understandable language and directed to specific points—about the interdependence of the food processing company and the people of the community.

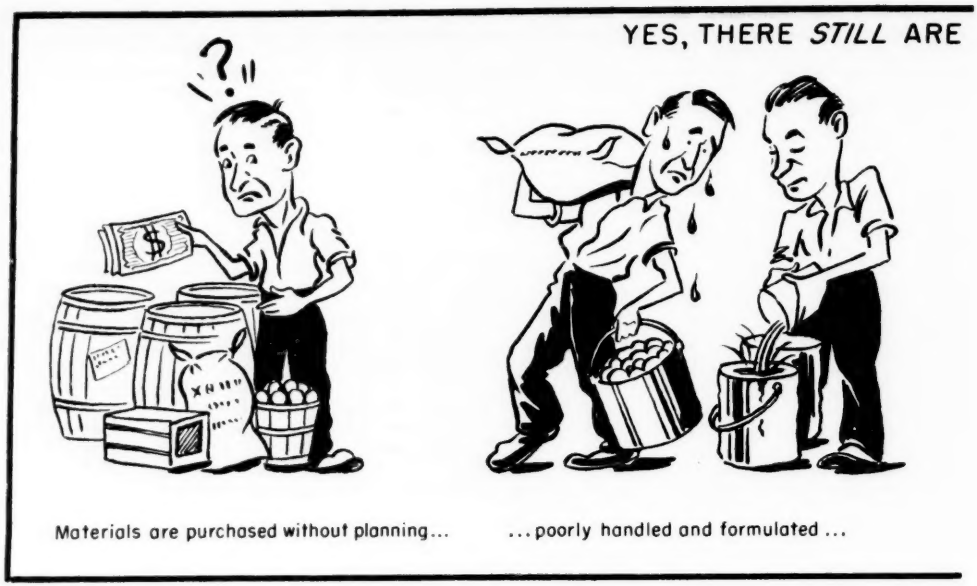
Gerber Products Co. is situated in Fremont, Mich., a town of about 3,000. Many families earn their livelihood in the factory. Every fourth dollar of income earned by farmers in the area comes from Gerber's. Cash available for spending by plant workers and farmers depends upon activities in this food processing plant. A copy of every company letter written to factory employees or farmers regarding employment or purchase of raw materials, goes to the 150 businessmen in Fremont. The purpose is to keep them posted so they may in turn arrive at intelligent business decisions. This is a practice that any close-to-home food processor can employ.

Food processors operating on a national scale know that they must have an active interest in the civic and rural enterprises of the communities housing their plants. Their personnel should be active workers in city and rural affairs. This is the usual practice of people in the local food factory, whose owner frequently is affiliated with many enterprises in the home town.

Open House at Quaker Oats

A move toward getting acquainted with the people in its mill cities was recently made by The Quaker Oats Co., which devoted a whole floor of its Sherman, Tex., warehouse to an exhibit showing all phases of procuring, handling, processing and selling of food products. Over 9,000 people attended. The most valuable result of this one-day exhibit was that it acquainted the people of Sherman with the local executives and placed upon these executives an obligation to be more active in community affairs.

In conclusion, every one of the 14 points of a good farm relations program has been successfully employed by enterprising food manufacturers. And each point can be as useful on a small scale in the home town of a small food processor as it is when employed on a national scale by larger manufacturers. Prime requisite is that these programs bear the stamp of friendliness and sincerity. Farmers are courteous people who like to do business in a friendly way. They are also keen bargainers. Good farm relations can be maintained when processors meet the growers half way.



How *Not* To Operate a Food Factory

This is a story of things done wrong—with the right way indicated. It is cheaper to learn from the other man's mistakes than from your own

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Many articles about advanced methods of successful companies have been published in FOOD INDUSTRIES. But this time we reverse the procedure—by taking a look at the *wrong* way of doing things. And while pointing up the mistakes, we suggest the remedies indicated. The operations cited are not found in any one plant, but are a composite of inefficient methods observed in a number of pie-baking factories.

About Poor Handling of Materials

Most glaring inefficiency encountered is wrong-way flow of materials. In one plant, storage and preliminary processing are on the first floor, with final processing on the floor above—while it should be the other way around.

Storing of raw material creates a major problem in this bakery. One shipment of flour or shortening may be conveniently stored next to the dough mixer. The next shipment of raw material may be put in another area, far from the mixers.

And things really get fouled up at the elevators that lift dough and pie fillings from the first to the second floor and bring the finished pies down. When batches of dough or fillings are dollied to the elevators, they often have to wait while the lifts bring racks of baked pies down to the loading platform. This bottleneck causes delays in feeding the dough into the dough cutter and rollers, delays in putting fillings into pies, and delays in loading the finished product into delivery trucks.

But this is not the half of it! The concrete floors are so badly worn that containers of cooked fruit sometimes are jolted off the dollies enroute to the elevator. Not only is the batch of filling written off as a total loss, but production is halted temporarily. And a worker must be pulled off his productive job to clean up the mess.

How can these difficulties be overcome?

First off, switch the mixing and filling operations to the second floor. Here, store the raw materials as closely to these operations as possible. And relocate the pie-making and baking operations on the first floor.

Instead of hauling the dough and fillings on dollies via elevators to the first floor baking department, chute the dough through the floor to the dough cutting and rolling machines and pipe the fillings into hoppers.

And, in the meantime, get those badly worn concrete floors resurfaced.

Mixing and Cooking "Mixed"

Another thing is that the mixing operations are not well planned. Mixers and cooking kettles are on platforms about 5 ft. above the floor. Workers must climb down from these platforms, walk 20 to 25 ft. to a scale, weigh ingredients and haul them back to the mixers or kettles.

This trouble can be multiplied. In another plant there is only one scale. Frequently, men operating the fruit cooking kettles at this bakery must wait their turn while those running the mixers weigh ingredients.

Now for the remedies: First, proportion bulk materials directly into cooking kettles and mixers. It is a simple matter, for example, to install a liquid sugar storage tank and meter the sirup into kettles. Also, flour and bulk sugar

FOOD PLANTS WHERE—

...and inefficiently processed...

...in an illogical flow

can be fed in predetermined quantities into dough mixers or cooking kettles.

Second, purchase lard or shortening in 50-lb. cartons rather than in 500-lb. drums. In this way, shortening will not have to be weighed. Simply adjust the batches so that 50-lb. multiples of shortening can be used. Not only is weighing eliminated by this method, but you are also rid of weighing errors, handling of heavy drums, and the cleaning and disposal of empty drums.

Third, set up a separate scaling room, where ingredients that are used in smaller quantities can be weighed for each batch. Such ingredients include salt, starch, eggs, and flavors. These materials can be weighed into suitable receptacles and transported to the mixers or kettles.

Inept Handling of Fillings

The cooling of pie fillings is another step that needs improvement in several plants. Fillings are gravity-drained from kettles into aluminum tubs in which they are cooled overnight at room temperature or under refrigeration. These tubs tie up floor space. And during warm weather there is some danger of the fillings molding.

A method should be adopted for cooling pie fillings more rapidly so that they can be used the same day they are prepared. One company, for example, has designed special vertical coolers that lower the temperature of fillings from boiling to room temperature in about 45 minutes. These coolers are equipped with jacketed cylinders and special agitators. The cylinder is lowered hydraulically through a hole in the floor. Then, the filling is chuted into the cylinder from cooking kettles, and finally raised for the cooling operation.

Adding custard or cheese fillings into pie shells in rotary or traveling band ovens is another inefficiency. The operation in a certain plant requires two workers—one dips the filling into a ladle, and the other pours the filling into pie shells.

By pumping the filling into an overhead tank, one operator can gravity-feed the filling into shells through a stainless steel pipe with a quick-opening valve. This method not only eliminates an extra worker, but it also saves time in removing the empty ladle from the bake oven for refill.

This bakery's method of loading pies into the oven is still another step that can be improved. Considerable labor could be saved at this plant by development of an automatic pie loader, instead of hand-loading pies with metal peels. One company has already developed a pusher that automatically moves ten pies at a time from a conveyor onto the oven conveyor. The pusher is synchronized with the speed of both conveyors.

Need for Better Purchasing

And now to another common inefficiency—purchasing. Methods of buying raw materials can be slipshod, especially if there are no specifications covering standards for raw materials.

Through inefficient buying of apples, the purchasing department in one pie bakery often creates unnecessary work for the production department.

For example, by getting small apples there may be too large a number of cores as well as too high a percentage of peeling losses. Apples with a diameter of 2½ to 3 in. run about 150 to the bushel, while 2 to 2½ in. dia. apples will total 220 to 240 per bushel. In the first case, there are only 150 apple cores and an 18 to 22 percent peeling loss. However, in the second case, there are 220 to 240 cores (32 to 40 percent more cores than the first bushel) and a 24 to 30 percent peeling loss.

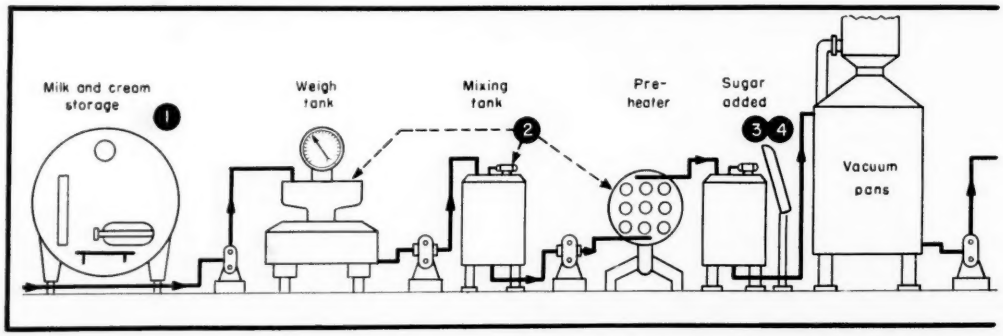
Take another example—the buying of blueberries. The solids content of berries grown in one area may be high, while the content of others from another area may be low. Yet, low-and-high-solids content berries are often purchased without being spot-checked.

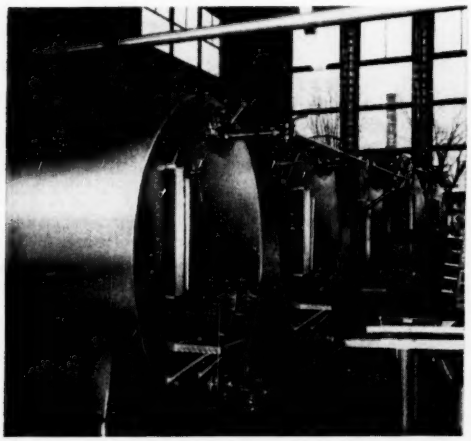
Also, there is a cost factor involved when uncleaned berries are purchased. If the blueberries are not field-cleaned, think of the stems, leaves, and dirt brought into the plant and the help needed to clean the berries. There is no economy in spending good money on foreign matter.

Even more anomalous is one company's lack of an efficient formula system. The weights of ingredients used are not checked periodically against the formulas of each

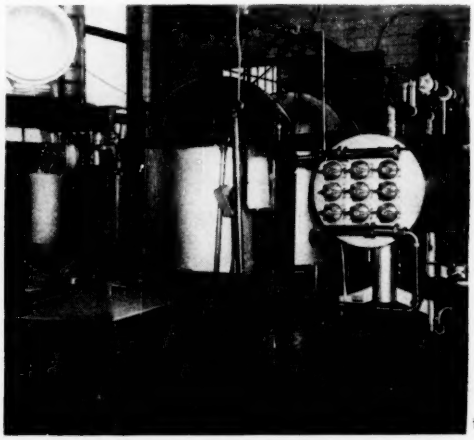
(*Turn to page* 182)

This Quick-Pasteurizing System Cuts Mix Costs

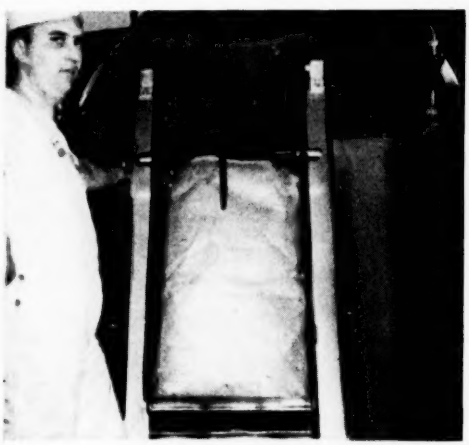




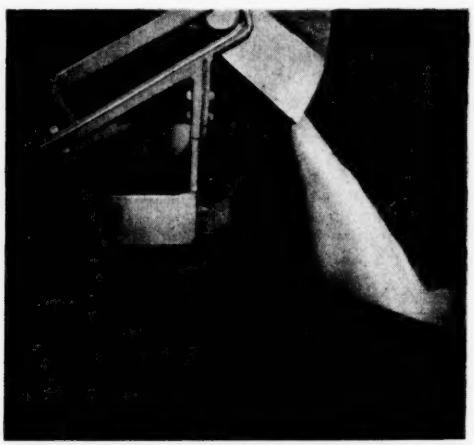
1 STORAGE TANKS. Raw dairy products to be used for mix-making are stored in these insulated tanks.



2 WEIGH TANK (left) proportions milk and cream in mixing tank (center). Heater (right) is of special design.



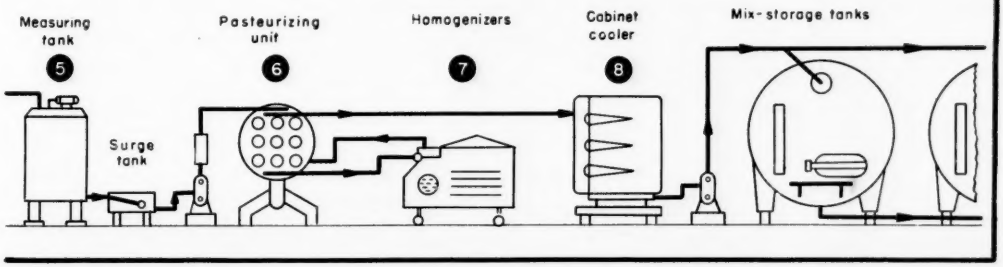
3 HYDRAULIC DUMPER eliminates lifting. Bags are positioned and opened, then valve is turned and . . .

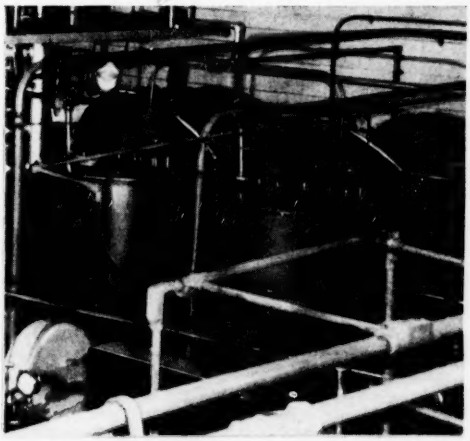


4 SUGAR is uniformly distributed over the surface of heated dairy products in stainless-steel mixing tank.

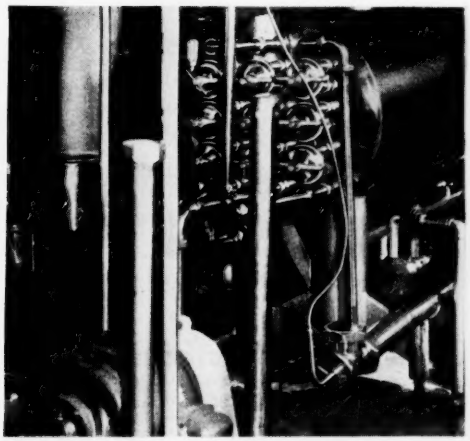
In 90 seconds, Hershey plant heats, homogenizes, pasteurizes and cools quality mix. Space and labor also are saved

See Story On Next Page

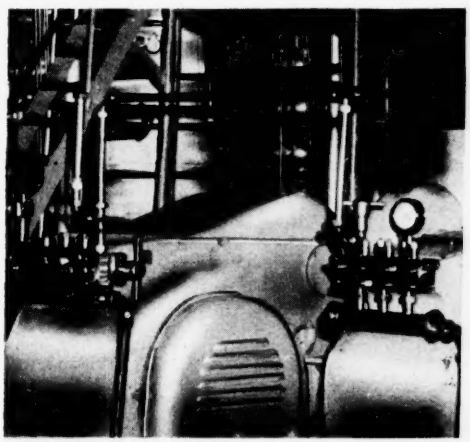




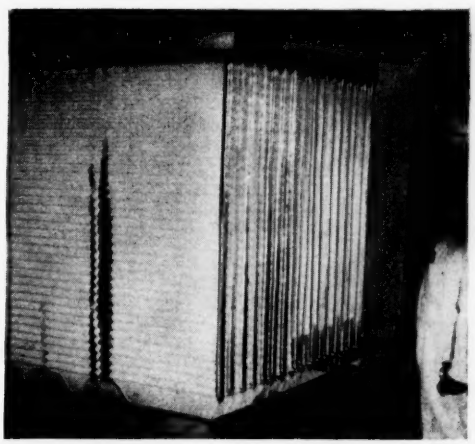
5 **MEASURING TANKS** receive individual mixes from vacuum pans and continuously supply pasteurizer.



6 **HIGH-TEMPERATURE UNIT** employs live steam. It was designed to heat dairy products without burn-on.



7 **HOMOGENIZERS**—combined capacities 2,000 gal. per hr.—subject mix to high pressures, breaking up fat.



8 **MIX COOLER** combines water and direct expansion ammonia units. The leaves fan out for easy cleaning.

BOTH QUALITY AND ECONOMY are high with this short-time mix-making operation that employs high-temperature.

This Quick-Pasteurizing System Cuts Mix Costs (Cont'd)

A. V. GEMMILL
Assistant Editor "Food Industries"

Application of the high-temperature short-time pasteurization to ice cream mix—in the only large-scale operation of its kind—is one of the outstanding features of the modern ice cream plant of Hershey Creamery Co., Chambersburg, Pa.

Advantages of this method of pasteurization over the conventional holder-type system of mix making are notable:

Less floor space and equipment are required for the same production capacity.

Flavor of the mix is improved, since it is only a matter of minutes from the time the dairy ingredients are removed from low-temperature storage until they are concentrated, homogenized, pasteurized and cooled.

Physical condition of the mix is better as the result of the higher pasteurizing and homogenizing temperatures employed.

Bacterial count of the finished mix is comparable to that of mix pasteurized at 165 deg. F. and held for 30 min.

Accurate temperature and time controls are assured, as in the case of HTST pasteurization of milk, by use of a flow diversion valve.

And, there is an appreciable saving in labor.

Quick Heating and Cooling

In the Chambersburg installation, all ingredients that go to make up the mix are preheated, condensed, and pasteurized at 175 deg. F., then quickly cooled to 30 deg. F. From the time the mix enters the high-temperature unit until it is completely pasteurized, homogenized and cooled to 90 deg. over the water section of the cabinet cooler, approximately 1½ min. has elapsed. Homogenization is performed at 157 deg. before pasteurization temperature is reached.

With the exception of the high-temperature pasteurization and subsequent operations, which are continuous, mixes are made in individual batches. To provide a continuous flow of mix to the pasteurizer, duplicate single-effect vacuum pans are employed. And two stainless-steel, agitator-equipped, measuring tanks are provided, into which the individual batches from the pans are pumped and, if necessary, standardized before entering the pasteurizer.

Upon leaving the pasteurizer, the mix is quickly cooled by means of a cabinet-type cooler. In this unit, the mix first flows over the water section, where it is cooled to approximately 90 deg. F. Then it is pumped into the top trough of the second section and flows over coils refrigerated with direct expansion ammonia. Temperature of the mix leaving the direct expansion section is 30 deg. F. From here it is pumped into one of the horizontal, stainless-steel, refrigerated storage tanks located in the ice cream freezing room.

Dairy products used in this operation consist of whole milk and fresh cream obtained from collecting stations in the vicinity.

Mix is used in Chambersburg for the manufacture of the company's bulk ice cream and novelties. The greater part of the mix produced here, however, is

transported by tank trucks to the company's large plant in Harrisburg, Pa., where pint package production exceeds that of any other plant in this country.

No Concentrated Products Used

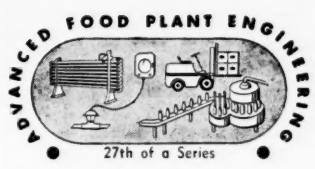
Fresh milk and cream, in proportions calculated to give the proper percentages of fat and milk-solids-not-fat in the finished mix, are pumped from the raw products storage tanks to a weigh tank, then into a 600 gal. agitator-equipped, stainless-steel mixing tank. From here the batch is pumped through a preheater, that raises its temperature to approximately 145 deg. F., and into another, identical, mixing tank where the sugar and stabilizer are added. Dissolving of the sugar at this temperature is almost instantaneous.

From this tank, the mixture of ingredients is drawn directly into one of the stainless-steel vacuum pans and condensed until samples show that the proper initial concentration has been reached. Then the mix is pumped from the pan into one of the measuring tanks.

The two measuring tanks are used alternately, one being filled with condensed mix from a vacuum pan while the other is emptied. A small, float-controlled balance tank, between the measuring tanks and pasteurizer, insures a continuous supply of mix to the pasteurizer.

Heating of the mix for pasteurization is carried out in two steps, although the same unit accomplishes the entire operation. The mix is first pumped from the balance tank through 16 tubes of the heater. Here, the temperature is raised from approximately 130 deg. F.—temperature of mix leaving a condensing pan—to 157 deg.

Upon leaving the first section of the heater, the mix flows to the two homogenizers (combined capacity,



2,000 gal. per hr.), where it is processed before reaching pasteurizing temperature. Temperature of the mix leaving the homogenizers is approximately 162 deg.; the rise—5 deg.—is the result of friction within the machines.

Pasteurized at High Temperature

From the homogenizers, the mix returns to the heating unit and passes through an additional 8 tubes, where it is heated to 175 deg. F. Upon leaving this section, the mix enters the holder tube which is mounted on the heater. In this tube the mix is held for 25 sec. at 175 deg.—the length of time found necessary to properly pasteurize ice cream mix.

Immediately following the holding period, the hot mix is quickly cooled to 30 deg. over a cabinet cooler—first to 90 deg. by flowing over the outside of the water section, then to 30 deg. over the direct expansion ammonia section. Cooled mix is pumped to insulated, refrigerated storage tanks.

Special Heating Units

High-temperature short-time pasteurization of market milk has been widely accepted for a number of years. But, because of the heavier body of ice cream mix, and the higher temperature required to insure its complete pasteurization, equipment developed for milk was unsatisfactory. The sugar and high milk-solids-not-fat caused deposits (burn-on) to build up quickly on heating surfaces. This produced off-flavors, in addition to mechanical difficulties.

The heating units employed at Chambersburg were specially designed to heat viscous dairy products to high temperatures without burn-on. They are comprised of $1\frac{1}{2}$ in. stainless-steel milk tubes set in insulated heating drums.

Heating is effected by live steam, supplied to the heater controls at plant line pressure. The controls reduce the steam to low pressure, or even vacuum, before it is admitted to the heating drum. This dry, low-pressure steam transmits its heat to the stainless-steel milk tubes passing through the drum. The resulting condensate, and non-condensible gases, are removed by a vacuum pump mounted below the cylinder.

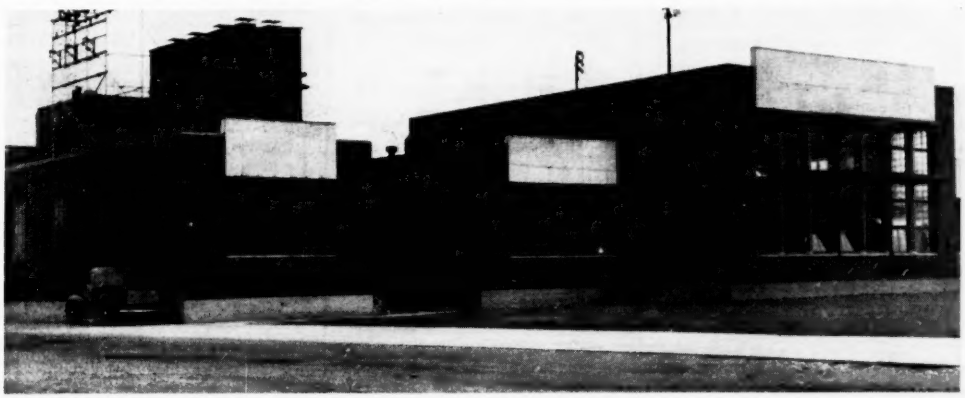
Air-operated controls insure accurate heating of the mix in these units.

Hydraulic Sugar Dumper Used

A novel piece of equipment was recently installed to eliminate hand dumping of sugar into the mixing tank. This unit (see Photos 3 and 4, p. 42), which operates from city water pressure, accomplished two purposes: (1) It eliminated high lifting on the part of the operator, and (2) it insures uniform distribution of sugar on the surface of the hot mix, thus speeding the dissolving process.

Bags of sugar are moved on a hand truck from the adjacent dry storage room and placed, one at a time, in the lowered chute of the dumping unit. Then the bag is opened, securely fastened in place, and a valve turned allowing water from the plant system to enter the cylinder of the hydraulic lift. The chute moves upward until the bag in it is inverted. Sugar then flows down the stainless steel chute onto the surface of the swiftly moving, heated mix.

When the bag is empty, a turn of the valve reverses the water flow and lowers the chute to the loading position.



HERSHEY'S Chambersburg, Pa., plant is of one-story construction. Ceilings are high and window areas are large in the manufacturing rooms. Interior walls are of cream-colored tile to the ceilings, and floors are of red tile.

TABLE I—DAILY Flat-Sour Bacteria Counts

Date (1948)	Filler No.	No. of Flat-Sour Bacteria
6/19	1	Less than 100/ml.
	2	Less than 100/ml.
	3	Less than 100/ml.
	4	Less than 100/ml.
	5	Less than 100/ml.
6/20	1	Less than 100/ml.
	2	Less than 100/ml.
	3	Less than 100/ml.
	4	Less than 100/ml.
	5	1,000/ml.
6/21	1	Less than 100/ml.
	2	1,800/ml.
	3	3,000/ml.
	4	3,000/ml.
	5	900/ml.
6/22	1	Less than 100/ml.
	2	2,000,000/ml.
	3	3,500,000/ml.
	4	3,900,000/ml.
	5	4,000,000/ml.
6/23	1	100/ml.
	2	Less than 100/ml.
	3	100/ml.
	4	Less than 100/ml.
	5	Less than 100/ml.

TABLE II—CONTAMINATION Carried Into a Plant, as Shown by Daily Flat-Sour Count

Blancher	Sampled ½ Hr. Before Canning Started	Sampled ½ Hr. After Canning Started	Sampled At 4:30 P. M.
1	Less than 100/ml.	20,000/ml.	8,000/ml.
2	Less than 100/ml.	51,000/ml.	Less than 100/ml.
3	Less than 100/ml.	18,000/ml.	3,600,000/ml.
Blancher Washer			
1	Less than 100/ml.	Less than 100/ml.	Less than 100/ml.
2	Less than 100/ml.	10,000/ml.	1,500,000/ml.
3	Less than 100/ml.	40,000/ml.	1,400/ml.
Filler			
1	Less than 100/ml.	9,000/ml.	40,000/ml.
3	Less than 100/ml.	2,300,000/ml.	2,000,000/ml.
4	Less than 100/ml.	35,000/ml.	3,300,000/ml.
5	Less than 100/ml.	4,000,000/ml.	6,000,000/ml.

TABLE III—INCUBATION ANALYSES of Packs in Nine Plants, 1946 Through 1948

Plant	Year	Percentage Flat Sours			Percentage Thermophilic Anaerobes			Percentage Putrefactive Anaerobes		
		Peas	Beans	Corn	Peas	Beans	Corn	Peas	Beans	Corn
1	1946	37.1	13.3	....	....	....	....	....	....	....
	1947	5.5	0.0	....	20.0	33.0	....	....	....	....
	1948	2.3	0.0	....	15.9	12.2	....	4.5	5.5	....
2	1946	52.0	....	21.0	....	....	....	....	....	....
	1947	16.6	....	0.0	9.4	....	36.8	15.8	....	5.4
	1948	0.0	....	0.0	19.3	....	18.8	3.3	....	6.8
3	1947	42.1	1.8	....	10.0	32.7	....	0.0	....	....
	1948	0.0	0.0	....	16.6	46.0	....	4.1	0.0	....
4	1946	9.9	....	5.6	....	....	....	....	....	....
	1947	0.0	....	0.0	10.0	....	50.0	8.0	....	0.0
	1948	2.4	....	1.8	24.4	....	35.5	0.0	....	0.0
5	1946	6.7	....	....	....	....	....	....	....	....
	1947	3.4	....	....	14.0	....	....	7.0	....	....
	1948	3.5	0.0	....	21.0	53.0	....	3.6	0.0	....
6	1946	60.0	8.3	....	....	....	....	....	....	....
	1947	18.7	0.0	0.0	6.6	14.2	20.0	5.2	13.3	0.0
	1948	0.0	2.4	0.0	6.2	14.6	26.3	0.0	2.4	5.3
7	1946	44.2	....	....	....	....	....	....	....	....
	1947	7.0	....	0.0	15.2	....	60.0	0.0	....	....
	1948	6.0	....	....	15.1	....	....	0.0	....	....
8	1946	....	....	10.5	....	....	....	....	....	....
	1947	....	....	0.0	....	....	39.0	....	....	9.0
	1948	....	....	0.0	....	....	12.5	....	....	5.5
9	1948	35.3	....	11.5	14.7	....	30.0	6.0	....	1.9

1948 Averages (Percent)

	Flat-Sour	T. A.	P. A.
Peas	4.6	19.0	3.4
Beans	0.04	20.2	3.3
Corn	2.5	21.0	3.8

Comparative Averages (Percent) 1946 through 1948*

Year	Flat Sours			Thermo. Anaerobes			Putref. Anaerobes		
	Peas	Beans	Corn	Peas	Beans	Corn	Peas	Beans	Corn
1946	35.0	10.8	12.3	....	....	....	....	....	....
1947	13.3	0.6	0.0	12.2	26.6	41.2	6.0	....	3.6
1948	2.0	0.6	0.4	17.0	31.4	23.3	2.2	2.0	4.4

* Plant No. 9 not included.

Daily-Survey Plan Effectively Curbs Bacterial Spoilage

Contamination is down, sanitation up, and product quality improved in canneries adopting every-day check for control of organisms

E. J. KRASKA

Kraska Food Laboratory, Manitowoc, Wis.

Considerable reduction in warehouse spoilage and spoilage potential has been accomplished in canneries that have initiated daily bacterial surveys.

For example, during the past three seasons the canneries employing such programs have shown a 33 percent drop in potential flat sour spoilage of peas. In addition, the warehouse spoilage (actual spoilage) declined as much as 1½ percent.*

Presented here is Kraska Food Laboratory data showing the general trend of the bacterial load within the canning plants, the result of the incubation of over 5,000 cans, and also the bacterial load variations during the time the plant is in operation.

Since flat sour bacteria do not produce gas, the containers retain their normal appearance. This makes it impossible to detect flat sour spoilage before the containers are opened. Hence, control can only be accomplished through bacterial analyses and good sanitation practices.

It was found that the degree of flat sour spoilage is usually high in plants which do not run complete daily bacterial checks. There is no definite way to correlate warehouse spoilage with probable flat sour spoilage, but it may be said, in general, that the higher the warehouse spoilage, the greater the flat sour spoilage.

From careful studies of the degree of contamination for single plants over an entire season, it has been found that spot checks are not adequate from the standpoint of control. The basic weakness of such checks lies in the fact that

* The terms "potential spoilage" and "actual spoilage" are used, respectively to differentiate between the theoretical spoilage obtained from incubation results, and spoilage actually detected at the time of labeling. A decline of 1½ percent in actual spoilage is considered very high.

the bacterial load is constantly changing during the time of operation and during shut-downs. The unrelated spot-check sample taken for bacteriological analysis represents only the condition at the time of sampling.

Reports Tell Story

The need for bacterial surveys is clearly evidenced by the data in Table I. This information, taken from the daily reports of a canner, gives only filler counts. However, the rest of the equipment revealed a similar condition.

This particular plant carried out identical cleaning procedures for the first four days. During this time, the blancher counts remained reasonably low, although they did show signs of an increase by the third day. Improperly cleaned post-blancher sorting tables were main causes of the increase.

On the fifth day, the entire plant was thoroughly cleaned, with special attention given the sorting tables. The counts then dropped quite low (as shown in the 6/23 reading of Table I). If a plant is operating for long hours, the in-plant bacterial load will increase steadily, due to insufficient time for cleaning the equipment.

If daily bacterial surveys are not made, there is no way to control such bacterial build-ups as those recorded in Table I. From the analyses of daily reports it was found that there is a definite population cycle. The counts ran low for a few days, then began to increase as places were missed in the cleaning procedure. As soon as the source of contamination was located and the equipment properly cleaned, the counts dropped. Since the source of contamination changes constantly, the cleaning job must be thorough.

A good example of contamination being carried into a plant on the raw product is illustrated in Table II. Here, the data consists of three surveys made in one plant at different times during a single day of operation. Only flat sour counts are shown.

From this table it is possible to note the changing state of the bacterial load within a plant. The ideal condition would be to run bacteriological checks every hour, although the cost would be prohibitive for most canners.

However, a single every-day bacteriological check gives nearly as accurate a picture of the conditions within the plant. Then by studying the bacteriological reports for the preceding season, a canner is able to locate the most troublesome spots in his line and give them special attention. Since each season has its own problems, however, the daily checks are always necessary for guidance of the clean-up crews.

In many canning plants, the processing is inefficient. During the past season, numerous studies were made by our laboratory on the proper handling of retorts. It was found that in many cases the sterilizing value of the process within a given retort varied from F_o 2.5 to F_o 8.0.**

This was due to a few simple factors: Instead of following the NCA recommendations, the retorts were operated by a time-saving method adopted during the war. In using this procedure, the retort is filled and closed, the steam is introduced through the bottom, and the regulator is by-passed while the retort is being brought up to processing temperature.

The purpose is to bring the retort to temperature in a much shorter time than the recommended method. Actually, this method of by-passing the regulator does raise the retort temperature much faster, but it also tends to develop cold spots within the retort.

Consequently, the process is shortened as much as 12 min. in the area of the cold spots. The top and bottom crates of cans are adequately processed, but the center crate is often grossly underprocessed. By adequate bleeding and by using the regulator to control the come-up, the problem of cold spots can usually be corrected.

The proper operation of retorts is one of the most important points in successful canning. The retort studies were made with a Brown 18-thermocouple potentiometer. The thermocouples were placed in cans throughout the retort and temperatures were taken at 1 min. intervals.

In employing the daily survey service, one of the plants controlled its bacterial load so well that it seldom had counts of over 200 flat sour bacteria per ml. of sample. Yet it had over 2 percent potential flat sour spoilage.

In this instance, the piping in the cook room had been changed so that it was possible to bring a retort to processing temperature much faster. But this acceleration of the come-up decreased the sterilizing value of the process to a minimum. This heat process is adequate under nearly ideal conditions, yet, if the plant should become heavily contaminated, the actual spoilage would increase proportionately.

The necessity for bacterial control and sound processing cannot be overemphasized. They are "musts" in all food processing plants, and they are dependent upon one another. The bacterial load affects the efficiency of the process; the process affects the quality; and the quality affects the sale of the finished product. In this sequence, troubles can multiply. But they can be averted by maintenance of high quality through proper processing.

Program Pays Dividends

Data in Table III reveal how some canners have lowered their spoilage potential over a three-year period through guidance from daily bacterial surveys and through better processing procedures thus indicated. This data was gathered from tests of more than 5,000 cans. Each can was incubated at the proper temperature, then it was opened, subcultured, and the pH determined. The findings were recorded and correlated with the results of the daily bacterial surveys. Spoilage of the incubated cans could usually be traced to high counts or poor processing.

Some of the canning plants had a higher seasonal spoilage potential in 1948 than in 1947. The situation was due to seasonal changes in the degree of contamination and carelessness on the part of the clean-up crews at the beginning of the pack.

In Table III, specific note may be made of the reports on Plant No. 9, which began using the daily surveys in 1948. The spoilage potential for this plant was 35.3 percent—almost identical with the average of the other plants in 1946. This would indicate that flat sour contamination is still prevalent in the industry as a whole, although many canneries have shown considerable improvement.

Spoilage control demands the constant cooperation of the canner and the laboratory. Through laboratory control, it is possible for a canner to keep his finger on the pulse of his complete processing line at all times. The laboratory report should be used as a precise tool for achieving better plant sanitation and greater processing efficiency.

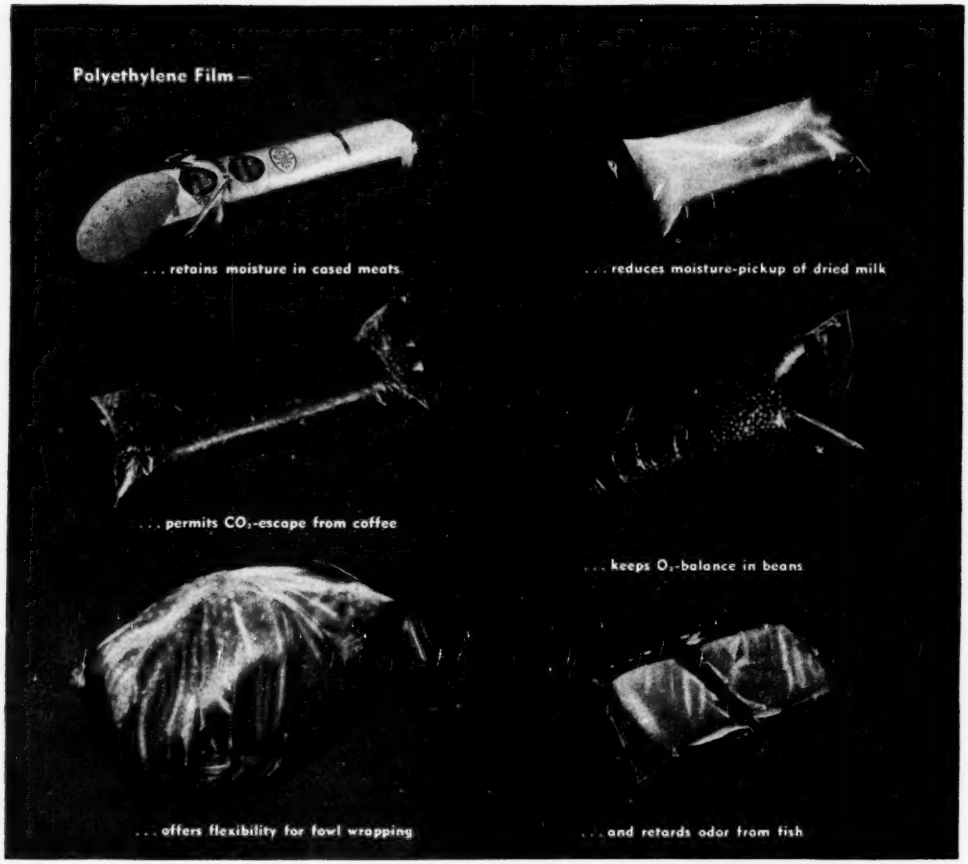
About Flat Sours—

When a can of vegetables is opened and the contents taste flat and fermented, it is called a "flat sour". Investigations have shown this condition is due to the growth of thermophilic bacteria, which develop only at relatively high temperatures.

Thermophiles are spore bearing. Some species are facultative thermophiles growing normally above 100 deg. F., but also capable of growing at 70-106 deg. F. Others are obligate thermophiles which grow at about 100-170 deg. F.

Since it is practically impossible to sterilize foods heavily contaminated with spores of the obligate thermophiles, control definitely lies in preventing their entry into the product.

** The F value is the time in minutes required to destroy a given organism in a given solution at 250 deg. F., while the F_o value is the time in minutes required to destroy the same organism at a different temperature, i. e., at 240 deg. F.


Polyethylene Film—
. . . retains moisture in cased meats
. . . reduces moisture-pickup of dried milk
. . . permits CO_2-escape from coffee
. . . keeps O_2-balance in beans
. . . offers flexibility for fowl wrapping
. . . and retards odor from fish

"Poly" Wrap Seen Filling Many Packaging Needs

Notable advantages of flexible film are low transmission of moisture vapor, high transmission of gases, and ability to retard or transfer odors

F. WARREN TAUBER
A. J. DAVIS
and MEYER GOLDMAN
The Visking Corp., Chicago

Because of its unique physical properties, polyethylene film* bids fair to be the answer to some of the food industries' more salient packaging problems.

Specifically, the requirements it meets are: Low moisture-vapor transmission; high oxygen, carbon dioxide, and sulphur dioxide transmissions; differential transmissions of food odors; and flexibility at low temperatures.

Polyethylene—a polymerization product—is made by pressure-heating ethylene gas in the presence of a suitable catalyst. The resin thus formed is tough and waxy. It melts between 221 to 248 deg. F.

Seamless tubes are formed by extruding the resin through suitable dies. The extrusion process produces molecular orientation, which results in physical properties in the longitudinal direction different from those in the transverse direction. Physical properties of polyethylene film are listed in Tables I and II.

High oxygen and carbon dioxide transmission and low moisture-vapor transmission of this film permit its employment for many specialty food packages. And high sulphur dioxide transmission suggests several applications in the packaging of dehydrated foods.

Oxygen and moisture-vapor transmissions are shown in Table I. Carbon dioxide transmission was 1528 cc. for a 2-mil film (0.002 in. thick) and 616 cc. for a 3-mil film, based on 100 sq. in. of film in 24 hr. Sulphur dioxide transmission was 2,000 cc. on a 2-mil

* Polythylene film, manufactured by the Visking Corp., is designated by the trademark, Visqueen.

film under conditions comparable to the carbon dioxide tests.

Low temperature flexibility and the "puncture-without-splitting" characteristics of the film make it ideally suited for frozen food packaging. Because it is non-toxic and does not contain a plasticizer, the film is deemed excellent for packaging foods that are in direct contact with the wrapper.

The film can be readily heat-sealed. Flame-sealing is especially good, and it is easily demonstrated, as follows: A piece of tubular film is inserted between two metal bars, with approximately ½ in. of the film allowed to protrude from the surface of the two bars. Then, a flame is touched to the protruding portion of the film, which melts to a bead, and retracts to the surface of the bars.

An ordinary jaw sealer may be used, but a mask of inert material must cover the sealing jaws. A temperature of 220 to 250 deg. F. is the suitable range at which to begin sealing. It is necessary, of course, to work out the sealing conditions best suited to the packager's needs.

Stretch-Wrapping Foods

Returnable stretch is a property of the film that permits ready overwrapping of many foods. Foods that are relatively symmetrical may be overwrapped by stretching the film, inserting the item, and allowing the stretched film to recoil and adhere to the item thus enclosed.

The amount of returnable stretch is usually 12 to 15 percent, based on the original dimensions of the film. Stretching is accomplished in this manner: The polyethylene bag is inserted into a shaped metal mold. Then a vacuum is applied, giving a uniformly stretched film. Dimensions of the mold and the film are such that the film is stretched within the limits of its elasticity.

Low Moisture Pick-Ups

Federal regulations specify that the moisture content of non-fat dry milk solids be below 5 percent if the product is to be used for human consumption.

In a test, dry milk solids, in 4-oz., 1-lb., and 2-lb. amounts, were sealed in polyethylene bags. These bags were stored at 85 deg. F. and 85 percent relative humidity. Samples were also held at 78 deg. F.

Table III indicates the results. Obviously, the amount of moisture picked up varied with the conditions of storage. Samples in 4-oz. packages at room temperatures were satisfactory after 180 days. At 85 percent relative humidity and 85 deg. F., they remained satisfactory for over 60 days.

Influence of surface/volume ratios also becomes apparent in this experiment. Under the same conditions (85 percent relative humidity at 85 deg. F.) moisture pickup was larger for the 4-oz. package than the 2-lb. package. The shape and size of the packaged material is extremely important to the relative success or failure of a protective wrapper.

The foregoing is a good example of protecting a packaged food from any appreciable moisture absorption during storage.

Polyethylene film is now used commercially as a barrel-and-drum liner for bulk storage of non-fat dry milk solids. Obviously, the surface/volume ratio here is small.

The 4-oz. quantities were packed in envelopes (5x5 in. with a total surface area of 50 sq. in.). The 1-lb. packages were made from 5-in. flat width tubing and were approximately 8.5 in. long. When packaged tightly, the dimensions of the package were approximately 2.5x2.5x6.5 in., and the surface area was approximately 75 sq. in. The 2-lb. packages had a surface area of 120 sq. in. They were prepared from the 5-in. flat width tubular film.

Moisture Retention in Sausage

Ability of polyethylene film to retain moisture in packaged foods has been demonstrated in the storage of liver sausage. This product is normally stored for 10 to 14 days at approximately 40 deg. F. Frequently, a condition described in the trade as "brown ring" occurs, especially near the end of the storage period. Laboratory studies have shown that this condition is chiefly due to surface dehydration.

Liver sausage may lose 10 to 12 percent of its weight during two weeks of refrigerator storage. But, liver sausage processed in "Visking" No. 30 fibrous casing and overwrapped with a polyethylene tubular film lost only 0.2 percent of its weight after three weeks' refrigerator storage. The product was

(*Turn to page* 184)

Characteristics of Wrapping Film Gaged by Laboratory Tests

TABLE I—High Transmission of Oxygen and Low Transmission of Moisture Vapor Are Two Important Traits of Polyethylene

Average Thickness of Film, Mils	Oxygen Transmission,* Cc. Per 100 Sq. In. Per 24 Hr.	Moisture-Vapor Transmission** (General Foods Method), G. Per 100 Sq. In. Per 24 Hr.
1.0	597	1.45
2.0	295	0.70
2.5	219	0.58
3.0	172	0.46
4.0	150	0.38
5.0	112	0.30
6.0	95	0.25
7.0	87	0.20

* Determined at 77 deg. F. with pressure differential of 725 mm.
** Determined at 100 deg. F. at 95 percent relative humidity against vapor pressure of $CaCl_2$.

TABLE II—Directional Properties of Polyethylene Film* Differ

	Deg. F.	Longitudinal Direction	Transverse Direction
Tensile strength, lb. per sq. in. at	77.0	2,482	1,597
	32.0	2,987	2,050
	−0.4	3,428	2,524
Elongation, percent stretch at	77.0	228	184
	32.0	100	53
	−0.4	71	42
Tear strength, g. per mil thickness at	77.0	181	123
	32.0	44	291
	−0.4	28	262
Impact puncture resistance, in.-oz. per in. of tear at	77.0	90	50
	−0.4	61	53
Flexure	−0.4	Satisfactory	Satisfactory

* Average thickness 0.00207 in.

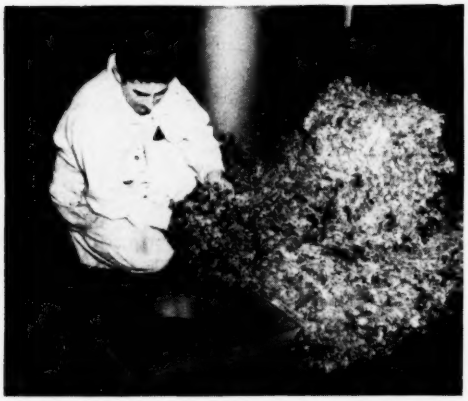
TABLE III—Non-Fat Dry Milk Solids Packaged in 2-Mil Polyethylene Film Picks Up Very Little Moisture

	Percent Moisture During Storage at 85 Deg. F. and 85% Relative Humidity Size of Package			Percent Moisture During Storage at 78 Deg. F. Size of Package		
Storage Time	4 oz.	1 lb.	2 lb.	4 oz.	1 lb.	2 lb.
0 days	2.7	2.7	2.7	2.7	2.7	2.7
30 days	4.0	2.9	2.9	...	2.9	3.1
60 days	4.4	...	...	...	...	...
90 days	6.0	3.9	3.9	3.8	3.4	3.4
120 days	6.4	4.1	4.0	...	...	...
180 days	...	4.8	4.9	4.8	4.2	4.3

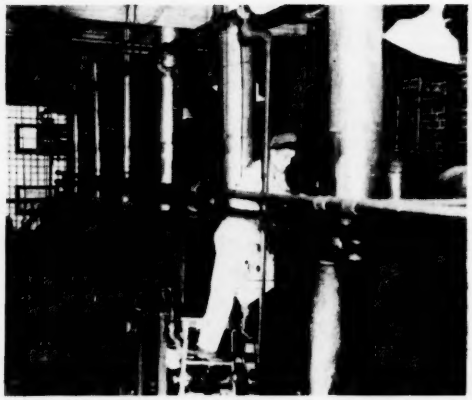
TABLE IV—Transmission of Essential Oils Through Polyethylene Film

Oils	Grams Per 100 Sq. In. Transmitted by 2-Mil Film in 24 Hr.
Vanillin	0.018
Methyl salicylate	1.150
Coriander oil	0.879
Petit grain	0.606
Nutmeg oil	7.470
Lemon oil	14.241
Orange oil	14.033
Grapefruit oil	16.756
Cassia oil	0.262
Geraniol	0.168
Geranium oil	0.423

QUICK 10-STEP PICTURE of the Processing of Irish Moss

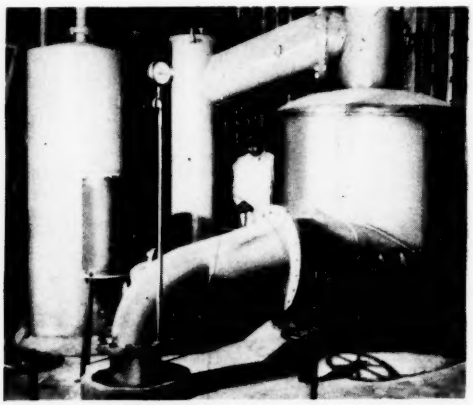


1 **TESTED MOSS** is blended according to lot number, then fed into hopper emptying into cooker on floor below.

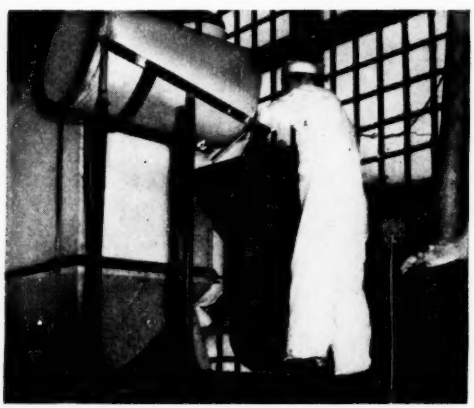


2 **IN FIRST STEP,** this battery of cookers removes impurities by washing. Then the seaplant is cooked.

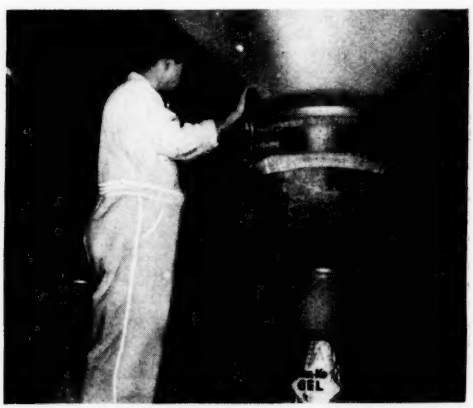
5 **PRESSURE FILTERS,** aided by filtering agents, clarify viscous solutions containing extractives.



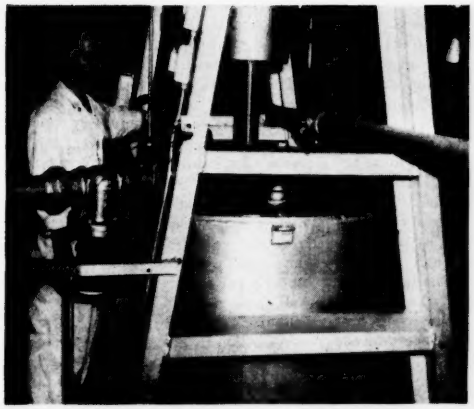
6 **VACUUM-TYPE EVAPORATORS** concentrate the filtered solutions to a solids content of 1.6 to 2.0 percent.



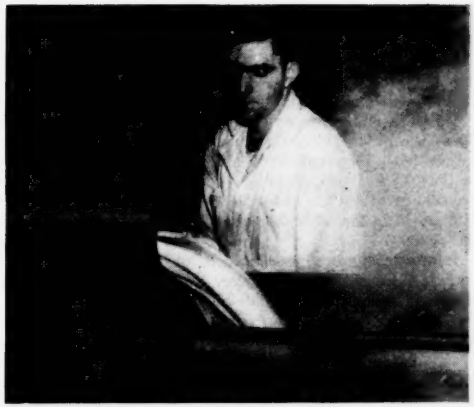
9 **DRIED EXTRACTIVES** go through rotary cutter, then are ground to powder in micro-pulverizer (center).



10 **DOUBLE-CONE MIXER** (top) then blends extractives to give uniform product (seen here being packaged).

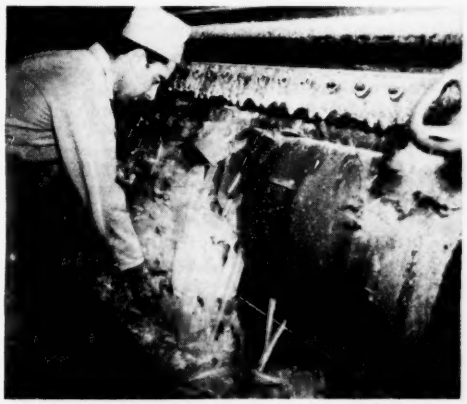


3 **LARGE CENTRIFUGE** separates the water-soluble extractives from mix. Later, residues are re-extracted.



4 **HOT EFFLUENT,** with 0.8 to 1.0 percent solids, flows to filter aid-slurry tanks on floor below.

7 **MOISTURE CONTENT** of the extractives is reduced to 5 to 6 percent by these continuous double-drum driers.



8 **STATIONARY** knives continuously cut sheets of dried extractives coming from a drier-drum.

Seaplant Extractives Recovered by New Technics

Technology of processing Irish moss and other seaweeds has been modernized and uses of the refined products have multiplied

JOHN GODSTON
President, Godston Laboratories Corp., Staten Island, N. Y.

To meet new demands for extractives following the shortage created by the war, the 600-year-old Irish moss industry has been modernized and expanded. As a result, improved extractives and other refined hydrocolloids are now available.

Cut off from its foreign supply of the moss (*Chondrus crispus*), Krim-Ko Corp. of Chicago was faced with a really tough problem: "Just where was the company to get new supplies as a source of the extractive used as the suspending agent in making chocolate milk beverage?"

The company's first move was to check domestic supplies of raw moss. And there were soon revealed adequate sources along our northeast coast, particularly around Scituate, Mass. The moss was also found growing in profusion around Rockland, Me.; Halifax, Nova Scotia; and Prince Edward Island.

But finding new sources was not enough—because establishment of a moss industry in this country involved numerous difficulties.

Problem after problem, involving both technics and materials, confronted Krim-Ko. But through persistence and ingenuity, these hurdles were surmounted.

First off, the idea of using domestic moss, in place of partially processed

moss previously imported from France, looked good. So Krim-Ko's "sparkplugs" in this undertaking—G. F. Gallagher, Earl C. Jertson, and A. E. Siehrs—decided to go ahead with the idea. But after a trial with the domestic moss, they encountered another problem—nonuniformity.

This lack of uniformity in the quality of the product was traced to: (1) Impurities in the seaplant, (2) changes in the physical properties of the hydrocolloids within the plants, and (3) differences in the methods of handling the moss.

Impurities generally consisted of foreign seaweeds and crustacea. Biological variations of the plants—caused by such growth-promoting factors as temperature, sunlight, and nutrients—contributed to differences in the stabilizing properties of the moss. Rate and amount of drying, extent of bleaching, and the amount of fresh water used to wash and bleach the moss before it was shipped, were all factors that affected the quality of the raw material during handling.

Refining Operations Begin

To solve this problem of uniformity, the recovery, from the crude seaplant, of extractives in a more purified, powdered form was considered. Company engineers then began to experiment. Domestic moss was shipped to the Chicago plant. Here there was started the costly process of alcohol-precipitating the water-soluble extractives and then tray-drying them. And the powered extractives proved practical for use.

Meanwhile, construction of a recovery plant was authorized at Scituate, where sufficient raw material was available. Hastily devised processing methods, however, did not result in the best possible finished product. And while great strides were being made toward production of a more uniform product, Krim-Ko was now confronted with another problem—wartime restrictions on alcohol.

Even so, the company executives did not throw in the sponge. Instead, they hastened to develop a new method of recovering the extractives—without using alcohol.

Executives of the company knew dairy technology and quickly called it into play. They applied milk-handling and milk-drying technics and equipment to a powdered Irish moss extractive recovery process.

Difficulties Persist

And so, production was again started clarifying water-soluble extractives by centrifuging and filtering, and then driving off the water in evaporators and drum-driers.

But the new process gave the Krim-Ko people more gray hairs. For, in carrying it out, the very properties that make the extractives so valuable proved stumbling blocks.

During recovery operations, solutions containing 5 percent solids could not be separated from the moss residues by the centrifuges. Nor was it a simple matter to filter the viscous solutions containing gelatinous material, which amounts to about 65 percent. Furthermore, the process had to be accomplished with a material that readily oxidized and hydrolyzed.

At this stage, the company set out to break these bottlenecks by installing a chemical laboratory and a small pilot plant. Top job for the laboratory was to learn more about the physical properties of the extractives. This knowledge was then put to test in the pilot plant operations.

Production Gets Underway

Outcome of these investigations was the development of a method of extracting hydrocolloids in higher dilutions. Since the solutions were now less viscous, it was possible to centrifuge and filter the extractives. Also, by constant laboratory control of the process, oxidation and hydrolysis were retarded.

Now that these difficulties were licked, production began to roll. Then by adding more driers, production soared to several thousand pounds a day.

With their output skyrocketing, the company was not only able to supply its own needs, but also the requirements of others. The refined Irish moss product is now available to the food industry and is sold under the tradename, Krim-Ko gel. Other refined hydrocolloids are produced and marketed under other trade names.

While this process development was going on, the war also cut off this country's supplies of such imported gums as arabic, karaya, and tragacanth. However, it did not take the company chemist, L. Stoloff, long to find out that the active ingredients from the moss and other seaplants could replace these gums and, in many instances, outperform them.

Soon after the Scituate plant began going full swing, other problems appeared. The company could no longer expand in its present location. The water supply was inadequate. And during the summer months, salt water seeped into the water supply and made recovery of the extractions difficult. To top it all, plant wastes could no longer be adequately handled.

Nor were these the only problems. Now that the war was over, company executives had to decide whether or not it was feasible to continue making refined Irish moss extractives in peacetime.

Before they made up their minds, Earl C. Jertson visited European countries. There he compared notes on processing methods and new markets that might have opened up for the refined hydrocolloids.

This is what he found: The principal producer in England was in the ice cream business. His recovery operations comprised extracting in ice cream vats, centrifuging, filtering, and then freezing out the extractives. In Norway, the alcohol-precipitation method was used. Most important, however, was the knowledge that the European countries had found new markets for the Irish moss extractives. And these markets, they felt, could be held in peacetime.

With this information, the company decided to stay in business. Plans for expansion were drawn up, and a new location was sought. Finally, a factory was selected in New Bedford, Mass. The building, situated near the waterfront, was redesigned to carry out the new production. This modern concrete plant, with the latest equipment, has 70,000 sq. ft. of floor space, enough for the expansion of present operations.

A word now about the procedure:

Several hours before low tide, skilled mossers don oilskins and start out in their dories for the moss-covered rocky ledges near shore. Here, they dislodge the moss with 18-ft. rakes and load it into the dories. Skilled mossers often rake 800 to 1,000 lb. of wet moss on a tide.

After the dories are rowed ashore, the moss is spread upon the beach and dried. The moss is then in a condition facilitating shipment, storage, and final use.

Extracting the Moss

At the New Bedford plant, 150-lb. bales of bleached and unbleached Irish moss are received in 30,000 to 40,000-lb. carload lots. Samples are then analyzed by the laboratory, and on the basis of these tests the raw material is blended according to lot number. Then the moss is fed through a hopper into asbestos-insulated steel extraction tanks, holding 750 gal.

Depending upon the test of the moss, anywhere from 115 to 135 lb. is added to a tank. To reduce the ash content of the finished product, cold-water soluble salts are removed. This is done by washing each batch with 500 gal. of city water. Seaplant and water are mixed for 15 min. by high-speed agitators. The rinse water is then flushed into the sewer.

After the moss has been washed, additional water is added. This time the water is heated. During the cook, the pH of the solution is adjusted with suitable neutralizers, depending upon the end use of the extractive. For ex-

ample, a special neutralizer is added when the extractive is used in making chocolate milk beverages. This agent does not precipitate the milk casein. Neutralization with potassium hydroxide is undertaken to increase the water-gelling properties of the extractive.

By properly adjusting the conditions of extraction, viscosity strength can be varied. Through pH control, hydrolysis of the extractive during processing can be prevented.

Purification Steps

Centrifugal pumps deliver the cooked moss through stainless steel pipes to two huge centrifuges. These solid-basket, suspended-type centrifuges are made of stainless steel. They operate at a speed of 1,200 rpm.

Each centrifuge separates the hot liquid extractive from the moss residue. One centrifuge handles the contents from each extraction tank. The residue, which amounts to two-thirds of the original moss used, is recovered from the centrifuge. And there are repeated extractions.

The liquid, now containing 0.8 to 1.0 percent solids, flows by gravity to 700-gal. stainless steel filter-slurry tanks that are equipped with turbine-type mixers. Here diatomaceous earth and activated carbon are added. After the slurry has been thoroughly agitated, rotary positive displacement pumps deliver it through four large plate-and-frame filters under a maximum of 80 psi. and at the rate of 1,500-gal. per hr.

After the liquid leaves the primary filters, it is delivered to 500-gal. slurry-holding tanks. Here, filter aid is again added and another slurry prepared. Rotary positive displacement pumps pass the slurry through a series of polishing filters.

The liquid is now pumped to an evaporator where, under heat and vacuum, half the water is removed and the solids' contents are doubled from 0.8-1.0 percent to 1.6-2.0 percent. A steam-piston pump carries the liquid to a 600-gal. stainless-steel holding tank. Next, the liquid is fed by gravity to four chrome-plated double-drum driers, where moisture content is lowered to 5 or 6 percent. As the drums revolve, the sheets of dried extractive are scraped off by double-edged flexible knives.

The sheets are collected in drums, then they pass through a rotary cutter, are collected in an air conveyor, and are ground to final size in a micro-pulverizer.

Double-cone blenders, holding 2,000 lb., mix the powdered extractive. The blender revolves at the rate of 10 rpm. Lots are analyzed for gel strength, viscosity, and milk suspending strength, then reblended to give a uniform product. Final step is packaging the refined, powdered extractive in paper-lined fiber containers.

The company is not resting on its laurels. Process developments are constantly under way with the hopes of improving the technology of refining the moss and removing its valuable extractives through better clarification, drying, and materials-handling technics. Investigations are even being carried out to devise a continuous method of recovery.

At the same time, the laboratory is developing new products by selecting various seaplants and by modifying certain conditions during processing operations.

Extractive Has Many Properties

The purified moss extractive product contains gelose (a gel-forming carbohydrate) and minerals that make it an effective colloid with properties as a—

LABORATORY CHECKS are constantly made during processing of moss. Test seen here is used in control of thickening strength.

1. *Gel-forming thickener.* When stirred into cold water, the extractive forms a thick paste. Later, when heated, the paste dissolves into a colorless, tasteless, and odorless solution that gels after it is cooled.

2. *Water absorbent.* Two pounds of the extractive will absorb 100 lb. of water.

3. *Milk "custardizer."* Dissolved in milk, the extractive forms a custard which is unlike those obtained from other ingredients.

4. *Emulsifier.* The extractive, when dissolved in water, sirup, or milk and then mixed with oil or fat, retards oil separation.

5. *Stabilizer.* Whipped with milk or egg whites, it forms a strong foam that resists breaking down or weeping.

6. *Suspending agent.* It keeps solid particles suspended in liquids, thus preventing any separation and settling.

One early use for the extractive was to suspend cocoa particles in chocolate milk. About 0.04 percent of the extractive reacts with milk proteins at 160 deg. F. to form a suspending system when cooled. This reaction also gives the milk a desirable body.

Multi-Use Product

About 0.5 percent of the extractive forms a palatable gel when it is heated and cooled in milk. This reaction is the basis for the old blanc mange puddings—also for a new line of flavored powdered mixes for milk puddings.

The extractive is also used in the brewing industry. When 5 to 7½ lb. are added to a 500-bbl. kettle of beer wort, the extractive reacts with proteins in the hot wort. In so doing, it accelerates coagulation of these proteins. These coagulated proteins settle out, carrying insoluble fines with them.

On cooling the wort to 60 deg. F., the extractive produces a second protein coagulation—the so-called "cold break." The coagulated proteins, as they precipitate, also carry along suspended matter, leaving a clear wort in which yeast may work. If these insoluble particles were not removed, they would tend to smother the yeast and to produce hazy beer.

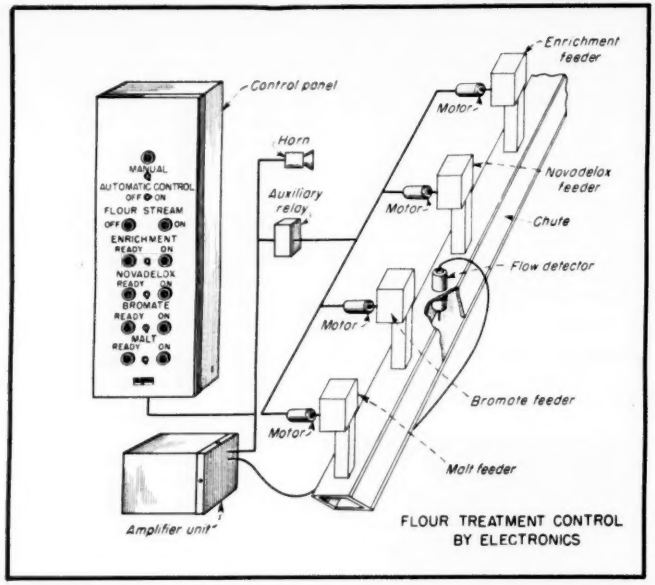
Frozen foods containing fats are subject to oxidative changes resulting in rancid, unpalatable, and unattractive products. Such changes have been retarded by dipping these foods in a solution containing 0.3 percent ascorbic acid and 0.5 percent Irish moss extractive. Protection by this dip-coating technic is achieved in three ways: (1) A physical barrier to oxygen is provided; (2) fats and oils are emulsified, thus minimizing their contact with air; and (3) the antioxidant system is reinforced by the synergistic relationship between ascorbic acid and the natural antioxidant present in the extractive.

Many Bakery Applications

Bakers use the extractive in their piping jellies, pie fillings, meringues, and icings. They may soon be using it as a dough conditioner in breads and as an emulsifier in cakes.

Piping jellies made with refined hydrocolloids are smooth and clean-tasting. Pie fillings have a short, tender texture. Meringues are short, tender, and stable. And icings remain creamy and moist, yet do not adhere to the wrapper.

Irish moss and other refined seaplant extractives are being used in ice cream mixes, processed cheese, marshmallow fluffs, salad dressing, jellied meats, low solids preserves, soups, aspic gels, water gel desserts, sirups, and sweet potato gels or pastes.



AUTOMATIC REGULATION of all feeders, synchronizing them with flour flow, is obtained with this electronic system. Operator sets feeder switches to "Ready" for a desired blend, and as soon as flour reaches detector, all selected feeders start operating, as indicated by "On" lights. If flow stops, feeders are automatically turned off and horn sounds.

Electronic Units Now Control Flow of Blending Ingredients

Uniformity of quality is increased, and operational costs and material losses reduced, in New York flour mill employing electronic regulation

F. S. McCULLOUGH
Buffalo Electronics Corp., Kenmore, N. Y.

With the recent introduction of electronics into the milling industry there have come new principles of operation, resulting in increased efficiency. Granted, electronics, by itself, cannot grind wheat. But it may do bolting—and in complete silence with no vibration. Also it may be used for agitation.

However, the most immediate benefits of electronics come from its application as a control for existing processes. Due to its speed, sensitivity and versatility, it will do things which sound impossible.

In the early part of last summer, the Buffalo Electronics Corp. was asked to seek answers to problems encountered by one of the mills in western New York. The outcome of this investigation was the development of the Signa-Flow and the Blentrol systems of control.

Sensing Element Described

At this point, I would like to describe just how the Signa-Flow system works, what it accomplishes, and the tangible, beneficial results. The first unit — the flow detector — essentially consists of a small needle, approximately $\frac{1}{32}$ in. in dia. Fastened to the chute, it intrudes into the flour stream about 1 in.

This needle "feels" the flour moving by, and originates a signal which is sent to the second unit, an electronic amplifier. The voltage from the detector is too feeble to operate a relay, and so must be amplified to the required level. The amplifier is similar to the one in your radio set, except that it is more carefully designed and built to withstand rigorous duty.

Before considering the rest of the system, let me point out the unique operating feature of the first two units, made possible through the use of electronics.

Imagine placing your finger in a chute. If the flour is moving, you readily feel it, because it pushes against your finger. But if the flour is not moving, you usually cannot detect it. Strictly speaking, this is not quite true, but it does remain that you detect the moving flour because it jostles your finger. And actually, that is what the needle does. It "feels" the flour movement by being jostled. If the flour stops, the needle is no longer jostled and the signal stops.

Thus, if a choke occurs, as soon as the flour has ceased moving the signal stops, and by means of a relay, a red light is caused to come on. After the chute has been cleared and the flour is flowing again, the needle is, of course, jostled again, and its amplified signal operates a relay to turn on a green light. This brings us to the third part of the system—the control panel.

On this control panel there are mounted a red and green light for the flour stream, a "ready" and also an "on" light, and a switch for each feeder. Behind this panel are mounted the necessary relays. This use of two lights, red and green, for the flour stream is an added precaution. One light or the other must always be showing.

What Unit Accomplishes

Now let us combine these various elements into a system that will accomplish a desirable result. First, a flour chute is selected which is centrally located to the treatment feeders, and on it is mounted the detector, at any convenient point within 30 to 40 ft. from the amplifier. The control panel should be installed at a point most centrally located to the normal operations. All of the feeders must be on separate motors so that they can be individually controlled.

Thus, in one location there are all the switches and lights to control and maintain a constant check on the treatment equipment, as well as on flour flow.

Now suppose the blender is ready to start operations. One red light is showing, indicating that no flour is flowing in the chute. Assume that malt and enrichment are to be added. The blender sets the feeder switches of these ingredients to "ready", indicated by the ready lights.

The flour is started, and when it reaches the control point, the red light goes off and the green light and feeder "on" lights come on, indicating that the feeders have started with the flour flow. If the flour should stop, the green light goes off, and the red light comes on. The feeder "on" lights also go off, indicating that the feeders have been automatically turned off. The feeders are automatically started again as soon as the flour flow is resumed.

Advantages Cited

Since in most mills the feeders are at widely spaced locations—even on different floors—the saving in man-hours is appreciable; for the blender can proceed to the source of the trouble and does not have to consider the feeders. Thus he can maintain a more constant level of production.

Obviously, the quality is maintained at a more uniform level, since the chance of over- or under-treatment has been practically eliminated. If a choke occurs, the blender is not required to hurry to the various feeders to turn them off and on again, because they are automatically turned off and on. This results in the virtual elimination of the former periodical patrols of that section of the mill, and the worker can apply his time to more productive things.

I have described a system of electronics as it is applied to treatment, and now I would like to sum up the advantages of installing such a system: First, there is the indication of the flow of the stream; second, the maintenance of quality of treatment; third, the reduction in operational costs; fourth, the possibility of increasing the production level; and fifth, the very appreciable saving in take-outs.

To carry this a bit further, let us assume that the mill superintendent wishes a constant and instant check on the operation of the various streams, feeders, and so forth. A panel upon which are mounted the necessary indicating lights could be placed in his office and wired into the system, thus providing the information desired.

An important feature of this electronic system is its sensitivity. As stated, the voltage generated by the detector is so feeble that it must be amplified. By using a considerable amount of amplification, very small quantities of material can be detected —for example, a few ounces per minute, or smaller. Even enrichment can be detected and made to indicate, by lights, whether or not it is feeding.

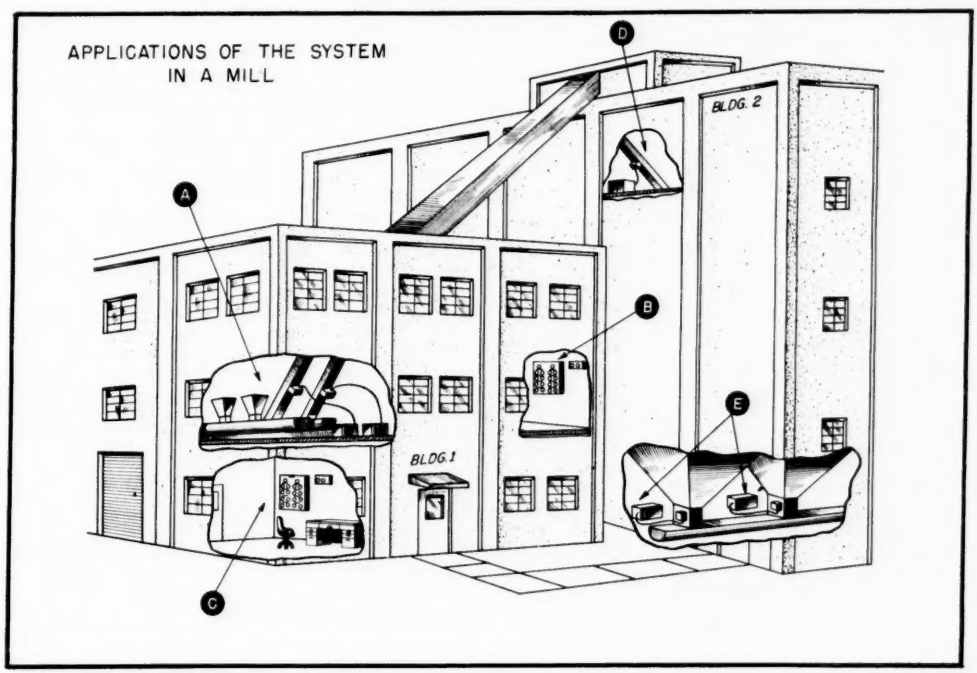
A detector applied to the chute between the feeder and collector conveyor will enable instant appraisal of the flow or non-flow of the material.

For instance, the hoppers in the malt feeders hold only 75 to 100 lb. and must be constantly watched. Here, a flow unit operating a red or green light will provide a constant indication of the operation. Another example is that of a self-rising-flour mill. A detector could be placed on each of the four ingredient chutes and the system interlocked, so that in the event that any one of the streams stopped, they would all stop and give visual and audible warning.

Blending System Developed

From observation of normal applications and sitting in on discussions by many millers, it was only a step to the development of the Blentrol system. This differs from the detector system only in the type of output signal. While the detector system provides a start-stop control, the blending system provides a control proportional to the flow of material. Many uses for such a control are immediately apparent. One of the first actual applications was to hold two streams in a constant ratio, regardless of the flow of the reference stream.

For example, in a mill stream to which is being added an ingredient, the two streams must be maintained in the ratio of 30 percent and 70 percent for the mill stream and the ingredient,



FIVE MILL APPLICATIONS of the system: (A) Units used to control and indicate feeding of several ingredients into two main flows of material; (B) and (C) duplicate control panels operating in conjunction with (A) equipment; (D) unit monitors material-flow from a chute; and (E) units interlock feed of materials from a number of bins.

respectively. Here, a flow detector is attached to a special section of chute for each ingredient, and the output obtained from the material jostling the needle is amplified by a special, very stable amplifier.

The two signals thus obtained are compared with each other on a basis of 30–70 percent. If the ratio holds, nothing happens. But should the mill stream change, a signal is obtained that no longer holds to the 30–70 ratio, and a special relay then acts to adjust the second stream to follow the increase or decrease of the mill stream. As soon as the ratio has been corrected, the relay moves to a neutral position and the adjustment stops.

Now, it is common knowledge that a feeder set to give one weight of material one day may not give this amount the next. Thus, there may be variation, a day later, in a mill stream calling for the secondary feeder to give 80 sacks to obtain the correct ratio. However, the flow detector on this feeder spots any change from the correct amount, and it then causes the feeder to increase or decrease, as required.

The following action of the secondary feeder does not go indefinitely to zero. It will give warning at some preset point that the volume is falling off, and at some minimum point it will cut off the system entirely, and warn by lights and horns. It is a simple matter to adjust the ratio of this mixing to almost any set of values —by simply turning a knob.

Ingredient Ratio Maintained

This blend-control system, as applied to flour treatment, offers a number of advantages not available in any other manner. A flow detector unit is fastened to the chute which carries the flour to be treated. Each of the feeders is equipped with a drive that allows its output to be controlled by the Blentrol unit. The operator sets the ratio of each ingredient for some average-size stream, and from then on the electronic unit maintains this ratio, regardless of mill stream fluctuations.

Accordingly, if a 100-sack stream is the average, and the enrichment is ¼ oz., this ratio is then maintained, even though the stream should drop to 50 sacks, or go up to 200 sacks. Any undetermined alterations of the stream are automatically met by a corresponding change in the feeder. In this way the ratio is maintained.

Again, the range is not infinite, but is restricted, by the available speed transmissions, to about 3 or 4 to 1. This means that if the above-mentioned stream should vary below 50 sacks or above 200 sacks, the enrichment would not hold to its preset ratio. However, there are developments in the offing which may permit wider control.

In this application, the man-hours saved are appreciable, since the operator does not need to be constantly altering the mix. In fact, the advantage extends beyond the saving in man-hours, since the ingredients can be maintained at the correct weight, with the assurance that the ratio will be kept, even though the stream rises or falls. In the case of enrichment the saving should be substantial.

Other Applications Cited

In addition to the application mentioned, there are others—such as maintaining a wetting agent in the correct proportion to the amount of water, and splitting streams going into agitators or chutes in preset amounts. In this latter application, a vane is set in the chute and driven by a lead screw, which is controlled by a system unit The ratio of splitting is easily adjusted, and is constantly corrected by two flow detectors, one in each chute.

Still other examples are applications in self-rising-flour mills and blending mills. The ingredients, monitored by flow detectors, are compared by special amplifiers, and the proportions are held constant at some set ratio. A variation in the size of the mill stream, or in the stream from a hopper, will influence the ingredient streams, so that they hold the proper ratio with the mill or hopper stream. As a further precaution, the system will be shut off entirely should any ingredients stop.

Another use for this system is in mills employing storage bins. A flow detector is placed in the conveyor system leading from a bin, and the output run to an amplifier. The flow from this bin is now read on a meter calibrated in cwts. In this manner, even unskilled labor can adjust the screw conveyors to give a set amount of material.

One further application is worth mentioning, since it has definite advantage. A flow detector is attached to the mill stream and operates into a recording meter. Now, since this unit is reading the instantaneous flow, it is recording the rate of milling. At the same time, it is integrating the sacks, so that at the end of any given time the total number of cwts. is known. It is the rate of milling that bears watching most closely.

Suppose that a rate of milling has been set for the night trick by the head miller. The following day, a recorded chart is available for study by the head miller—to ascertain whether or not the rate was maintained; how the rate held up in relation to low grade, when breakdowns occurred, and the like. This chart could be kept in some conspicuous place, so that the night millers could refer to it to know how they are doing. It provides an instant check on each minute of the 24 hours.

Some of these applications may appear fantastic. But in view of the equally fantastic things electronics is already doing in other industries, their actuality may be conceived. Although present installations of these systems are few in number, they are justifying the claims made for them—reduced operational costs and material losses, and increased uniformity of quality and efficiency of production.

Points On Installation

The equipment has been designed and built to be installed by the mill electrician, using drawings and plans supplied with the units, and drawn especially for that particular application.

The power required by this system is about the same as a 100w. light. The system can be supplied to operate from 25 to 60 cycle, 110 or 220v. Because of the newness of these operations, it is difficult to predict the life expectancy of the various components, but certainly one may figure on many thousand hours. Replacements are easily obtainable and not expensive to install.

Wherever practical, the units are made to be plugged into conventional outlets to facilitate maintenance. The system is designed for 24-hr. operation, and under such conditions that the only items needing periodic attention should be the tubes. Recently, one tube maker announced a line of tubes for industrial use which will give a minimum of 10,000 hours of life.

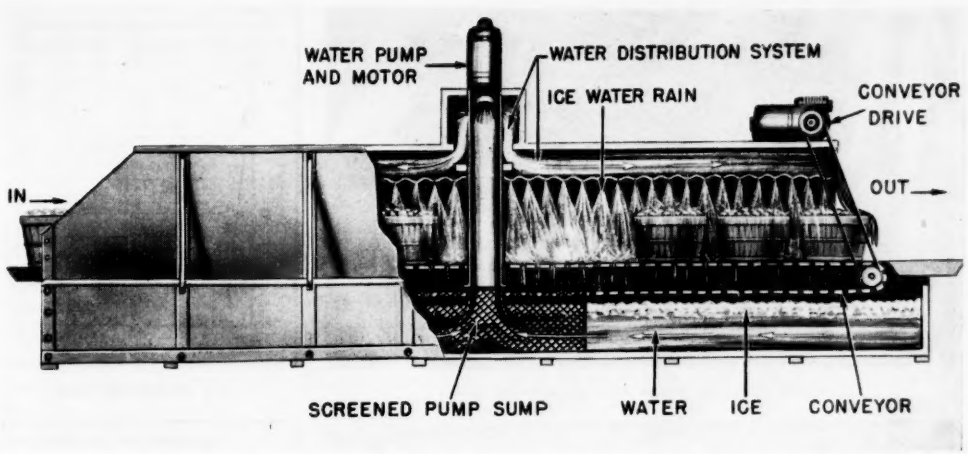
Finally, I wish to make it clear that, while electronics can do, and is doing, seemingly miraculous things, there will be cases where some other way may be cheaper. However, in the field of control, electronics is providing practical answers not hitherto obtainable.

This article was based on a paper presented by author at meeting of Association of Operative Millers, Districts 1 and 2, held in Manhattan, Kan., in April.

Other Food Uses Seen

The electronic flow control systems described in this article can be applied wherever dry ingredients are combined to form a product, or are used in the fabrication of a product. Units could be employed, for example, in feed milling, dry cereal milling, tea and coffee blending, tobacco blending, and feeding dry adhesives. Furthermore, the electronic systems will control gaseous and liquid materials.

—The Author.



CONTINUOUS antiseptic cooling is accomplished in this Stericooler.* Cutaway drawing graphically depicts how recirculating ice-cooled chlorinated water is sprayed over products as they go through machine on an endless-belt.

Antiseptic Cooling Retains Top Quality In Perishables

Using advanced equipment, processor can keep ready check on temperature pH, vitamin, and bacteriological changes—and hold costs in line, too

HAROLD L. LINK and, HARRY M. PANCOAST

Sprague Sells Div., Hoopeston, Ill., and Central Research Dept., San Jose, Calif., respectively, Food Machinery & Chemical Corp.

Orchard and field freshness of fruits and vegetables can be effectively maintained by rapidly reducing their temperatures as soon as possible after harvesting. Product temperature has been efficiently reduced by a direct application of a cold water flood. And equipment is available which combines the application of a cold water flood and a disinfectant.

How Microbes Are Controlled

Economy of operation of this equipment necessitates recirculation of the cold water. Under the conditions of handling products directly from the field or orchard, there is a rapid build-up of microorganisms in the cooling water. This condition is partially alleviated if the product is given a preliminary fresh water wash prior to being subjected to the cold water flood.

However, it was found desirable to develop an effective method of microbiological control in the cooling water. Consideration was given to the factors of effectiveness, non-toxicity, solubility, cost, and absence of deleterious effect on the product. Exceedingly rapid destruction of the organisms is necessary because of the rapid water flow and the continuous addition of unsterilized product. Also of importance is the necessity of selecting a disinfectant effective at the lower temperatures. The disinfectant used must be non-toxic, since it comes in direct contact with a food. Cost considerations are important due to the diluting effect of melting ice.

After testing several possibilities, chlorine and hypochlorite solutions were found to be the most adaptable for controlling the microbiological population within the cooling water. Hypochlorite solutions have been found satisfactory from a practical standpoint. Proportioning and controlling apparatus has been developed for applying the concentrated hypochlorite solutions. The demand for concentrate depends upon desired concentration, amount of suspended organic matter, and rate of ice meltage.

Where close control of concentrations is not necessary, a non-controlled, "squeegee"-type proportioning pump is satisfactory, provided occasional tests are made on the solution for available chlorine and the rate of pumping is adjusted when necessary. If more accurate control is necessary, a photoelectric controller is used.

In this unit, a very small volume of cooling water is pumped from the unit and mixed with an iodine indicator solution by means of a proportioning pump. The solution passes through a scanning cell and the amount of light (from a light source) that is transmitted is picked up on a photocell. The current developed in the cell is then amplified in an appropriate circuit, which actuates the motor that is used for pumping the hypochlorite solution.

When the available chlorine concentration in the cooling water has reached the maximum level, the motor of the hypochlorite pump stops; and conversely when the concentration drops below the desired minimum the hypochlorite pump motor is started. At a concentration of approximately 100 ppm. a deviation of ± 1 ppm. is normal, the limiting factor being the accuracy of sampling.

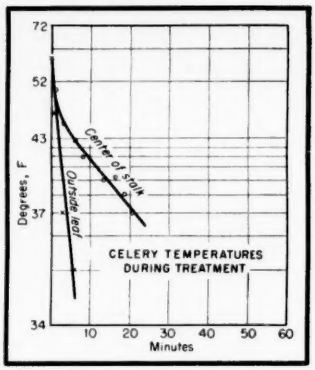
Five factors are taken into consideration in evaluating the disinfecting effectiveness of chlorine or hypochlorite solutions, namely: (1) Time of treatment (2) temperature, (3) concentration, (4) pH, and (5) amount of suspended organic material. Extensive investigations are reported in the literature on this subject.[1,2]

Inasmuch as this process is a combination of cooling with disinfection,

* Registered trade mark of F. M. & C. Corp.

Cold-Flood Processing Equipment Rapidly Conditions Perishable Products

Ice-water cascade drops celery temperature . . .



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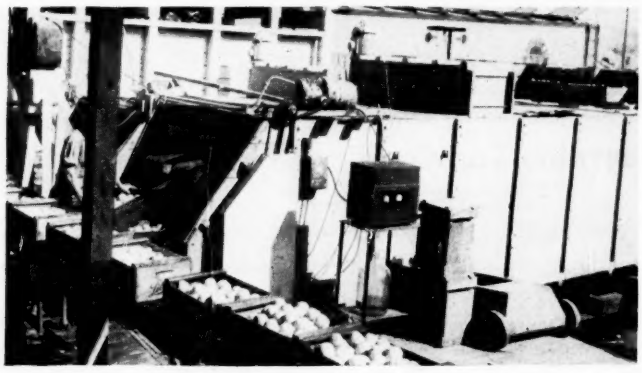
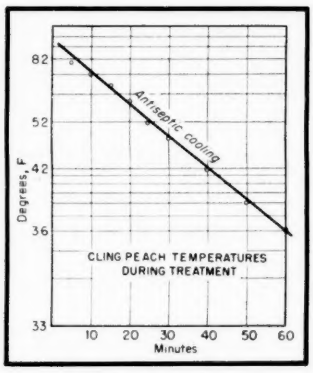


And cling peach cooling . . .



. . . is similarly effective

it is important to balance these two factors in commercial operation. It is particularly important, under operating conditions, to control the pH of the cooling water. A pH range of about 8.0 to 8.3 is indicated. Values in excess of pH 8.5 require extended treatment time, and in excess of pH 9.0 length of exposure necessary for a high lethal value becomes impractical. When below 7.5 and concentrations of available chlorine are of the order of magnitude of 50 to 100 ppm., the solution lacks stability.

Machine Described

Antiseptic coolers have been designed and operated combining application of a cold water flood and chlorine and hypochlorite solutions as a disinfectant to fruits and vegetables.

A larger unit (Page 57) equipped with a cross-slated conveyor is suitable for crated or boxed products. Overall length of this unit is 26 ft., height including pump motor 9 ft., and empty weight 6,500 lb. The conveyor is 19 ft. long and 6 ft. wide. Clearance between conveyor and water distribution plate is 34 in. The circulating pump has a capacity of 2,100 gpm., and the tank holds 1,950 gal.

Power requirements are 7½, 1, and ½ hp. for the pump, conveyor, and ice spreader, respectively. Construction of the tank and superstructure may be of wood or steel. Wood has a thermal insulating advantage, but has the disadvantage of drying out between seasonal operations.

For handling commodities in bulk, a small unit has been designed equipped with a woven-wire belt. Overall length of this unit is 19 ft. with a 17x4 ft. conveyor. Clearance between conveyor and water distribution plate is 18 in. Pump capacity is 1,150 gpm., and the tank holds 850 gal. Here, power requirements are 3, ¾ and ½ hp. for the pump, conveyor, and ice spreader, respectively.

Two means of refrigerating the water can be used, namely crushed ice or refrigerating coils. Operating under peak loads, the refrigeration demand is high. Since operation of the cooler is seasonal, ice is usually the most economical refrigerant. Ice consumption is governed by the product's initial and final temperatures and its rate of flow through the cooler in tons per hour.

One inherent advantage of using ice is its diluting effect, upon melting, on the silt, sand, or organic matter that tends to accumulate in the refrigerating water. A certain amount of water must be replaced—that carried out by the product and container.

If local ice costs are relatively high and the cooler can be used during a sizable part of the year, then the installation of refrigeration coils within the tank should be considered.

Crushed ice, entering the machine at one end, is distributed over the entire water surface by slowly rotating paddles mounted on a motor driven shaft extending from one side of the cooler to the other.

Machine Operation

Water in the unit shown in the illustration is brought to a temperature of approximately 33 deg F. and is moved vertically by means of a turbine type pump. The water then enters the

header box and flows toward both ends of the machine. The water flood is produced by means of ½ in. holes spaced in the valleys of corrugated galvanized iron sheets. For very tender products, the flood can be broken up into a finer spray by placing ⅛ in. wire screens under the corrugated iron sheets.

The water percolates through the product, down through the conveyor, and then onto the layer of ice. With an adequate supply of ice, the temperature of the water can be maintained at 33 deg. F. Crushed ice is added as needed. "Snow ice" is too fine, for it tends to plug the screens around the pump. Variation in conveyor speed is usually accomplished by changing sprocket sizes on the conveyor drive motor.

Applied to Vegetables—Asparagus

Cold water cooling, commonly known as hydrocooling, was used for several years by shippers of California fresh asparagus. It has been shown[3] that there are sizable increases in the crude fiber in asparagus after harvesting. The largest increase develops during the first 24 hours subsequent to harvest. Since crude fiber is an index of asparagus quality, it is essential to cool the product as rapidly as possible. It has also been shown[4] that asparagus has a very high respiration rate which is markedly influenced by temperature.

Fresh-shipped asparagus is subject to certain types of market diseases[5]. "Tip decay" (or bacterial soft rot) has been responsible for severe losses in transit. In addition, Phytophthora rot has also caused trouble during certain years. The use of non-treated water in the hydrocooler serves to spread the infection.

Several seasons ago, tests were made, in cooperation with several California shippers of fresh asparagus, on antiseptic cooling of the fresh, crated, vegetable. During this developmental program, determinations were made as to the reduction in bacterial count of the chlorinated water.

Prior to water treatment, several hundred crates of asparagus were run through the machine. It is of interest to observe how low the pH had dropped, prior to the addition of the hypochlorite. This is probably due to extractives from the water plus absorption of CO_2 from the rapidly respirating spears prior to the addition of the hypochlorite solution.

Cooling data on the rate of temperature reduction of spears of asparagus have been obtained. Temperature measurements were made with copper-constant thermocouples. Hand operated or recording potentiometers were used in these studies.

Tightly packed crates of asparagus containing about 30 lb. of product are usually cooled for 12 to 14 min. in the machine. Under these conditions, the asparagus is cooled to approximately 35 deg. F., even though the spears are tightly packed.

Since growers have begun to use this process for freshly shipped California asparagus, the economic losses due to market diseases have been materially reduced.

In the canning and freezing industries, this treatment of asparagus is particularly advantageous during peak loads, when temporary holding is necessary. In cooperation with a California canner and a Middle Western packer, tests of treated asparagus have been made. Of particular importance in handling white asparagus is the prevention of "rusting" (discoloration of spears) that develops prior to canning.

Washing and rapid cooling minimized this condition. This treatment, with a concentration 100 ppm. or less of available chlorine, produced a satisfactory product for canning or freezing, and in conjunction with low temperature storage (below 40 deg. F.) retained the original asparagus flavor and color for storage periods at least double those for untreated asparagus.

Procedure With Celery

Water cooling of crated, fresh, celery has been a common practice in the industry for several years. During the past few seasons, disinfection of the water has been initiated. This treatment has been primarily advantageous in those producing areas where pink rot, caused by *Sclerotina sclerotiorum* (Lib.) (DDY), has become established. The rate of heat transfer in cooling stalks of celery is shown on Page 58.

Normally, in commercial practice, crated celery is cooled for approximately 8 to 10 min. Water cooling or antiseptic cooling is of particular importance to the maintenance of quality, since the water produces a turgid condition in both leaves and leaf stalks.

Vined Peas

Factors studied in the antiseptic cooling of vined peas for canning or freezing purposes include temperature effects, pH changes, vitamin C changes, and bacteriological changes. These factors have been investigated both from the standpoint of the effect of the process and the changes which result during the subsequent storage period.

Most important factor is the sharp reduction of internal pea temperatures resulting from the flood of iced water flowing over the product and the resulting slow reheating rate of large containers of peas after they have once been cooled to temperatures well below 40 deg. F. (First Graph on Page 60).

Data used to develop these curves are taken from full scale commercial experiments utilizing large quantities of peas. An exposure time of four minutes in the unit is adequate for developing within the peas the equilibrium temperature of the iced water.

Average reheating rates are shown by curves A, B, C, and D. Typical storage conditions are represented, with the corresponding pea temperatures resulting from the particular types of containers. When vined peas are held for a few hours following the vining operation, internal pea temperatures develop which are considerably in excess of the surrounding air temperature.

Peas stored in wooden field boxes in large tiers, without adequate ventilation, are capable of developing internal temperatures in excess of 20 deg. F. above prevailing air temperatures (Curve A).

Vined peas treated by this process prior to storage, show beneficial effects (Curves B, C, and D). Cooling in the unit to below 40 deg. F. reduces the heat of respiration to an insignificant value. The heat gain, as indicated by the upward curve of the treated peas, is due to heat transferred from outside of the container walls, through the storage container, and into the bulk of peas. With untreated peas, those in the center were warmer than those in contact with the container walls.

It is possible to maintain lower temperatures in antiseptic vined peas stored in insulated containers. Additional refrigeration assures an increased advantage in maintaining still lower temperatures.

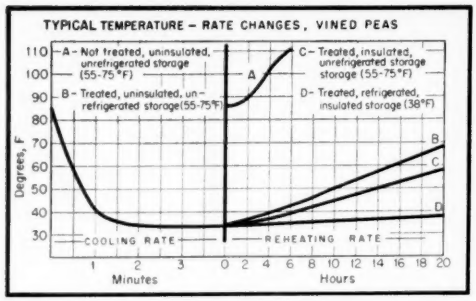
Crushed Ice Helps

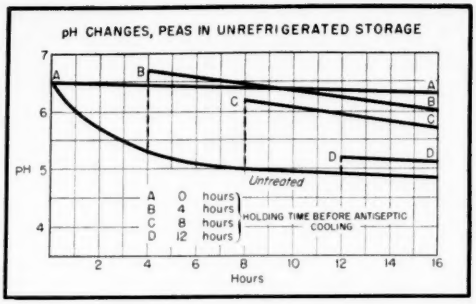
An economical method of providing additional cooling during storage utilizes a small quantity of crushed ice at the bottom and at the top of the container of peas. A ratio of about 1 lb. of ice to 20 lb. of treated peas was used in a mobile, 1,000 lb., insulated container to obtain a mean temperature reduction from 50 deg. to 45 deg. during an 18 hr. storage period.

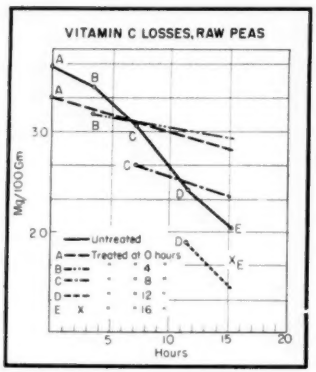
Effects on storage temperatures, pH, vitamin C, and bacterial load of vined treated peas are represented in Graphs seen on Page 60. Data for these graphs, taken from a single experiment, demonstrate the advantages gained by the immediate treatment of peas following vining.

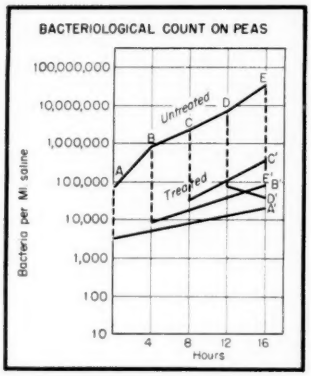
The peas were of the Alaska variety, and storage was in unrefrigerated, massed wooden field boxes. In this experiment, the peas were held for a total time of 16 hr. Separate lots were treated at 4 hr. intervals at 0, 4, 8, 12 and 16 hr. and corresponding holding times of 16, 12, 8, 4, and 0 hr. Average pea temperatures and the air temperatures prevailing during the storage

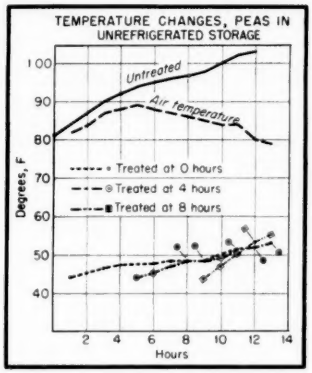
How Adverse Effects Mount When Treatment Is Delayed


TYPICAL TEMPERATURE – RATE CHANGES, VINED PEAS
A– Not treated, uninsulated, unrefrigerated storage (55-75°F)
B– Treated, uninsulated, unrefrigerated storage (55-75°F)
C– Treated, insulated, unrefrigerated storage storage (55-75°F)
D– Treated, refrigerated, insulated storage (38°F)
Degrees, F
COOLING RATE
REHEATING RATE
Minutes
Hours









are shown in Graph at right above.

Temperature of the warm, untreated peas increase 20 deg. above their initial reading, while the treated peas are maintained at 20 to 30 deg. below their initial temperature.

Surfaces of the untreated samples drop to a pH of 5 after 8 hr. holding time (Graph above). Treated samples in the same period of time remain at practically their original pH level. The untreated control samples changed in pH values from 6.43 to 4.90 at the end of 16 hr., whereas the treated peas changed in pH value from 6.43 to 6.31 at the end of the same storage time.

The pH values of the samples treated at intervals between 0 and 16 hr. are at intermediate levels between the treated sample at 0 hr. and the untreated sample at the 16 hr. level. Samples of peas canned from those which were held for a total of 16 hr. showed that only the peas treated at 0 hr. contained no flat-sour microorganisms when examined 6 months later. Vined peas which were held at least 4 hr. and longer before antiseptic cooling were flat-sour when examined 6 months after packing.

The effect of this process and the rate of deterioration of vitamin C are shown in Graph above. The untreated control sample contained 26 percent of its original vitamin C content at the end of the 16 hr. storage period, whereas the sample treated at 0 hr. retained 60 percent of its original vitamin C at the end of the same period. The sample treated at 4 hr. retained 49 percent; at 8 hr., 42 percent; at 12 hr., 29 percent; and that treated at 16 hr. retained 27 percent of the original vitamin C content at the end of the 16 hr. storage period.

It is evident that the sooner vined peas are treated, the greater the content of vitamin C in the canned or frozen product. Approximately the same relationship holds for vitamin B_1.

Graph above shows the bacterial data for the same experiment dealing with a delayed treatment. The total bacterial load was reduced by more than 95 percent of the total load on the vined peas, before the treatment. The rate of growth during the holding period was practically the same for both untreated and treated peas up to the 16 hr. level. It is generally true, however, that the final total bacterial load of each sample was intermediate between the sample treated at 0 hr. and the untreated pea sample at the end of the holding period.

The relationships between the pea temperatures, pH of the pea surfaces, vitamin C content, and total bacterial load on pea surfaces are made apparent in Graphs above. The inspection of canned samples from this group showed that the flavor and color were acceptable only in the case of the peas which were treated at 0 hr. and held for 16 hr. in unrefrigerated storage. Those samples which were treated after a delay following the vining operation were objectionable in flavor and generally lacked color uniformity. Peas treated at 0 hr. and held for 16 hr. in unrefrigerated storage were equivalent in flavor and color to untreated peas held 4 hr. and canned. In this instance the treatment increased the useful storage period of vined peas by a factor of four.

Fresh Peas

Experiments on antiseptic cooling fresh garden peas were made in conjunction with a California fresh pea shipper. The disinfecting action was found to be desirable in a twofold manner: (1) Spread of infection by the recirculated cold water was eliminated, and (2) economy of operation was effected because the water could be used for a longer time without the necessity of changing the tank and recooling the new water. There is required, for each fresh tank of water, from 3,500 to 4,500 lb. of ice.

The time of cooling for reduction to 35 deg. F. is approximately 12 min. for peas in bushel containers.

Lima Beans

Results with vined lima beans for canning or freezing have been very close to those obtained for vined peas. The rates of cooling and reheating, under a variety of storage conditions, parallel those reported under vined peas. A graph on this shows that the cooling rate of lima beans is almost identical with that of vined peas.

Such factors as the reheating rate of lima beans under controlled storage conditions, the bacterial count on the surface of lima beans, and the flavor and color of the canned product, have also been measured and are well known. In general, untreated vined lima beans become hot, sticky and sour within a period of 6 to 10 hr. following vining. The treated vined lima beans (in insulated containers having small quantities of crushed ice) remain cool, clean and sweet up to 18 hr. It is sometimes possible to retain the original flavor of untreated lima beans up to a period of 6 to 8 hr. The original flavor of treated samples may be maintained through a 16 hr. storage period before processing.

Corn

Experience in the handling of cut corn for canning and freezing includes small-scale operations on treating raw cut corn for canning and treating blanched whole cut corn for freezing.

The cooling time cycle in this machine for whole cut corn is similar to that for vined peas and vined lima beans. The re-heating rates for cut corn in insulated containers in non-refrigerated storage is practically the same as for vined peas.

Flavor tests on canned corn show that, with increasing pre-processing storage intervals, corn which is allowed to reach high temperatures loses flavor and becomes tougher at a much faster rate than cut corn that has been cooled below 40 deg. F.

Unhusked corn for the fresh market is water cooled in the packed crates. The time required to bring the temperature below 40 deg. F. is approximately 20 min. Fast cooling with this commodity is of extreme importance because of the desirability of reducing the rate of conversion of sugars to starch.

Cling Peaches

In the California cling peach industry there has been a trend in the last several years toward the planting of the midseason varieties because their quality is better than that of the older types. This growing condition has created an acute canning problem in that the length of the season has been shortened and volume of fruit to be handled during this period has very markedly increased.

In order to level out this supply of fruit, canners have been storing increasing quantities of fruit. Peaches normally do not store well. Deterioration is manifested in four ways, namely darkening of the tissue due to enzymatic action, microbiological growth on the fruit surfaces, reduction of texture, and desiccation of the fruit. Darkening will develop in bruises on the fruit and in tissue below surface mold growth. And in some fruits it will develop under unfavorable environmental conditions. The exact cause of this latter type of browning is not fully understood. Reduction of texture or "sponginess" is particularly objectionable during the canning operation, since surface discoloration is accelerated by the lye peeling operation.

In cooperation with a large California canner, tests were made with this process on cling peaches. This investigation had a four-fold purpose: To determine (a) the rate of temperature changes during the treatment, as compared with normal cold-storage temperature changes, (b) the effect of rapid temperature changes on the development of browning within the fruit, (c) the degree of molding on rapidly cooled fruit, as compared with slowly cooled fruit, and (d) the canning yield, in cases per ton of fruit, of the treated fruit as compared to fruit conventionally handled.

Cooling Rates Compared

Temperature measurements were made on fruit loaded on pallets in cold storage in order to compare this conventional type of cooling with the process. Brine-cooled air was used in these rooms, providing ideal cooling conditions. In the treatment tests, the peaches were conveyed through the machine while still in the field boxes, and temperature measurements were made during the period the fruit was being cooled.

Deteriorative changes occurring on and in the fruit during cold storage (including browning, molding and desiccation) are directly reflected in the case yield per ton of fruit. It is of particular importance in the peach canning operation to hold hand trimming to a minimum. Fruit which has considerable browning is expensive to handle.

The total increase in yield of antiseptic cooled fruit over conventionally handled peaches varied from 10 to 15 percent for fruit stored from 3 to 4 weeks at 32 deg. F. In addition, the yield of treated fruit not requiring hand trimming increased about 10 percent over fruit not so treated.

For antiseptic cooling, about ½ lb. of ice was required to cool 1 lb. of fruit from about 80 deg. to 40 deg. F.

Freestone Peaches

The freestone peaches, when tree ripe, are a highly perishable product and as such are more difficult to handle than clings. In cooperation with a California canner of freestone peaches, it was found that tree-ripe fruit, which is to be hauled for any considerable distance from the orchard to the canning plant, will have less brown discoloration developing if water cooled or antiseptically cooled prior to transport.

In respect to handling freestone peaches for the fresh market, it has been reported [6,7] that antiseptic-cooling will enable peach packers to ship riper fruit than is usual. There is also the added advantage of keeping the development of brown rot at a minimum.

This process adds to the efficiency and economy of plant operations. Because the treated products may be stored longer than untreated material, a regular schedule of operation is possible. A backlog of raw products, maintained in an original condition of quality, makes possible a flexible plant operation and largely eliminates from the production schedule such variables as weather and breakdowns.

Further efficiencies are to be found in the use of labor and in machine operation. And the product is improved. Definite labor schedules are possible with an available supply of cooled raw products. Plant equipment can be used on a definite time schedule and at a more uniform daily capacity during specified labor periods. Controlled treatment and storage conditions are capable of maintaining original quality in raw products up to certain limits and can prevent spoilage in many instances. Greater efficiency of raw product is possible by a reduction of down grading.

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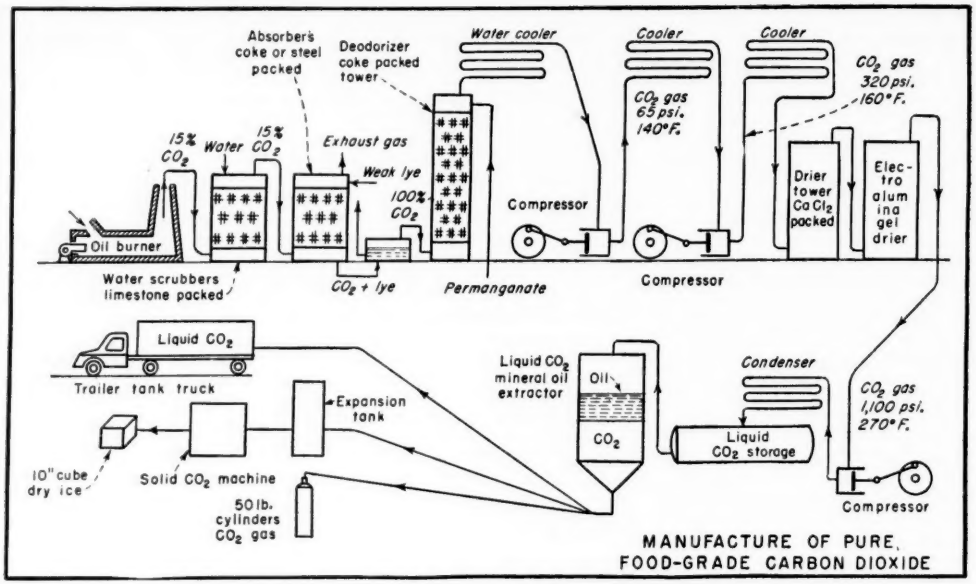
Is This How Your CO_2 Was Made?



FOOD-GRADE carbon dioxide requires special provisions in the manufacturing process for removal of impurities after compression. This flowsheet shows how the product is made. Note three possible methods of distribution to users.

Better Your Beverages With Pure CO_2

Off-taste and "bite" are imparted to carbonated drinks if nitrogen compounds formed in the manufacture and compression of gas are not first removed

M. SIVETZ
Chemist-Engineer,
Argonne National Laboratories, Chicago

Carbon dioxide used for carbonation of soft drinks can be a source of off-flavors in these beverages. This was confirmed at a bottling plant during the summer of 1948, when a biting carbonation, premature aging of flavors, and off-taste in a beverage were traced to an impurity in the CO_2 used.

In the carbonated beverage industry, CO_2 quality has been largely neglected. This is partly because of its chemical and physical properties, which have been such elusive characteristics to the bottling plant man. Then, too, just as one can get accustomed to a poor beverage and consider it normal, one can and does become used to an impure CO_2 gas.

How does pure CO_2 gas really smell? Many have smelled the impure gas for such a long time that they consider it to be good and normal. Actually, pure CO_2 has no odor. It has, however, a very characteristic physiological effect. It makes one's head feel very active and alert.

In the bottling plant mentioned above, the CO_2 had a harsh, camphorous, and stuffy-oily aroma. Permanganate purification was attempted without success. Then the gas was bubbled through mineral oil, at 300 psig., just before it was used for the beverage.

Most of the bite and disagreeable odor was removed. The oil, however, acquired a yellow color and, within a few days, a disagreeable odor.

Impurities Identified

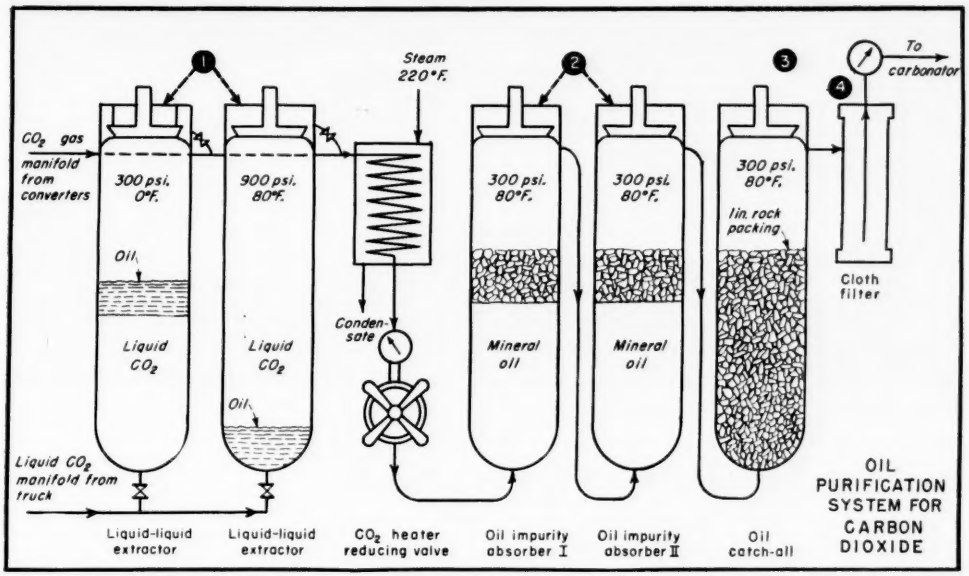
Investigation, by a competent qualitative organic chemist, revealed the impurity to be a complex, acidic nitro-organic compound. From its characteristics, the impurity was believed to be a hydrazine derivative. Due to the complexities associated with this type of analysis, and the chemical rearrangements possible, further isolation was not considered economically feasible.

Source of the impurity was found to be incomplete combustion of the fuel oil used to prepare hot gases for heating the lime kilns. Analysis of the oil showed 0.8 percent complex nitrogen. Although this is rather high, it is typical of certain types of oils.

Inasmuch as a single nitrogen atom may occur in a large molecule composed otherwise of only hydrogen and carbon, it is possible that 10 to 20 percent of the oil may contain nitrogen compounds. Comparatively little is known about these specific compounds, but they are acidic or basic, normally reddish in color, and have disagreeable odors.

The higher oxides of nitrogen, when present in CO_2, have been known to cause corrosion and flavor changes due to their oxidizing characteristics. These compounds give an orthotolidine reaction, and dry ice made from CO_2 containing them will often be yellow or blue instead of white. Their presence is due to too much air and too high a combustion temperature. For example, without catalysts the following nitric oxide yields are obtained: At 1,500 deg. C., 0.1 percent; at 2,000 deg., 0.6 percent; and at 2,500 deg., 1.8 percent.

If Not, Here's the Way You Should Purify It



SYSTEM for purification of CO_2 prior to carbonation of beverages: (1) Liquid-liquid extraction, in two 150-lb. converters; (2) gas to mineral oil purification, in absorbers I and II; (3) oil removal, and (4) filtering through cloth.

Combustion processes usually occur at 1,500 deg. C.

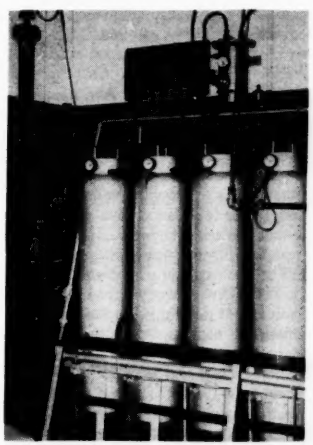
In an effort to eliminate the impurities in the gas, the CO_2 manufacturer changed from a high to a low nitrogen fuel oil. This was not effective, however. An atmospheric-pressure mineral-oil purifier-scrubber was then installed ahead of the compressors. This eliminated, to a large extent, the disagreeable odor. But only by using high pressure liquid-liquid extraction after compression could completely satisfactory purification be achieved.

After the liquid CO_2-liquid mineral oil purification, the carbonated water and beverage had a smooth carbonation. This was evidenced by the absence of bite, slow CO_2 liberation on the tongue, and a full flavor, bouquet, and body in the drink, as well as normal flavor aging.

Liquid-Liquid Purification

In the liquid-liquid purification method, transfer of the impurity from one phase to the other occurs under physical circumstances differing from liquid-gas absorption. The purification was accomplished by placing 1 pint of mineral oil (Shell Riselle) in each 150 lb. converter. Oils of higher boiling-point range did not extract the impurity as well. The liquid CO_2, at 0 deg. F. and 300 psig., entered the converter from the bottom. At this temperature, the liquid CO_2 is more dense than the mineral oil, but when it warms up to room temperature an inversion of phase occurs, and the CO_2 floats on the mineral oil (at 70 deg. F. and 900 psig.).

The oil reaches its maximum solubility in liquid CO_2 at 4 deg. F., when the densities of the two products are the same. When the CO_2 is evaporated, the mineral oil remaining in the converter is discarded. This oil is exceedingly yellow and has a disagreeable odor.



ABSORPTION CONVERTERS for the purification of CO_2. Also shown are steam heater (top) and filter (left).

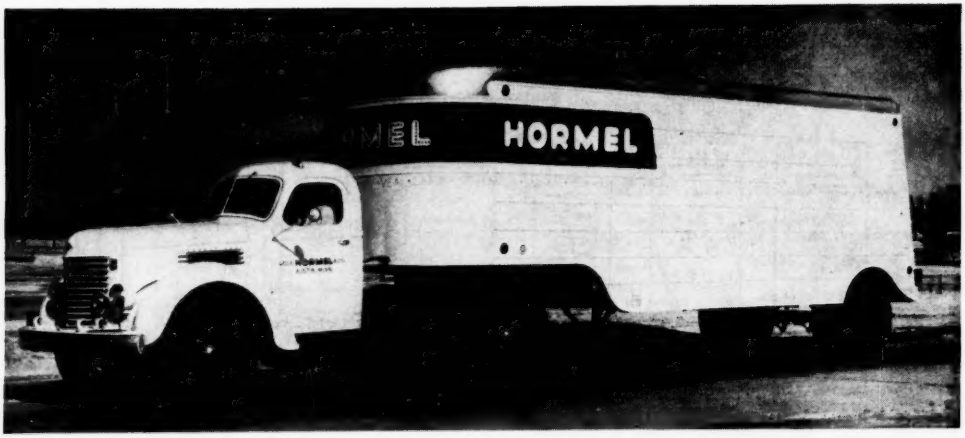
Other Sources of Impurities

By correlating experimental and operational data obtained at the gas purifier in the bottling plant, at the CO_2 manufacturing plant, and from laboratory tests, the following sources of impurities in CO_2 gas were determined:

1. *Carry-Through From the Manufacturing Process.* Because the sodium carbonate-bicarbonate solutions are infrequently, or never, changed, soluble impurities often pass through the evaporators with the CO_2 gas. When coke is used for packing the absorbent towers, the small, eroded carbon particles are effective adsorbers of foreign matter. When these particles arrive at the evaporator, they readily yield the adsorbed gases under heat, and these gases are driven off with the CO_2.

2. *Compressor Oils.* Decomposition of lubricating oils in the compressors introduces foreign odors into the CO_2. And these oils also are carried along with the highly compressed gas, as is indicated by deposits in bottling plant cylinders, converters and refrigerated storage holders.

3. *Unclean Containers.* When CO_2 cylinders and storage tanks are steam cleaned, or not cleaned at all, oil residues accumulate. Hot caustic solution with a hot water rinse and drying should be the washing procedure.



TRUCK DELIVERIES have increased from 4 to 11 percent, in seven years, at Geo. A. Hormel & Co.

Highway Food Haulage Takes a Spurt

Survey reveals that food processors are steadily turning from rail to truck transportation, due chiefly to lower rates and faster delivery

INCREASING reliance on truck transportation to cut distribution costs of processed foods and to reduce the cost of incoming raw materials came to light in a recent FOOD INDUSTRIES survey. Covering 37 food companies, the survey offers a cross-view of the measures being taken in the industry to offset increases in rail freight rates, imposed during the past two years.

It is not to be inferred that highway distribution is replacing rail movements of the nation's food products. Many factors are involved, such as heavy tonnage, low-rate staples, milling or other processing in transit, the difference between rail and motor rate structures in the various rate territories, the method of final distribution by the shippers and others, which gives the rails a cost advantage and will enable them to retain a great tonnage volume.

However, where the sales units to be moved are smaller, where the food products do not carry the lowest rate classifications, where the truck rates have not increased as much as the rail rates, and where time of delivery is a factor, there has been a shift to the use of highway transportation. In a few cases, this shift is as high as 35 percent.

Two Factors Involved

Where made, the shift from rail to road has been due to two principal factors: Circumvention of the railroad requirement that every freight car be loaded to full capacity, and a lesser increase in the truck rate than in the rail rate. The full-capacity-car ruling was put into effect in November, 1942, by the Office of Defense Transportation. Every car was required to be loaded to its full cubic capacity, or to the maximum weight it was built to carry. While last February's suspension of this ruling has now been made permanent, the part the rule played in the shift to trucks should not be minimized.

Costly Practice

Many food products shippers found it both difficult and expensive to meet the full capacity ruling because the quantities it was necessary to load into each car were larger than their usual sales units. Stowing of cars to full height, or load limit, also required extensive bracing and the use of mechanical loading and unloading equipment, all at the expense of the shipper.

FOOD INDUSTRIES' survey showed required car loadings of 20,000 lb. for crackers, cookies, etc.; 30,000 lb. for cereals; 40,000 lb. for tea and soup mix; 60,000 lb. for canned goods, fresh and frozen fish, and up to 90,000 lb. for sugar.

It was expected that the maximum car loading rule would be lifted after the war. However, the postwar carloading records equalled those of the war period, and the shortage of steel tended to delay the delivery of new cars—so the rule remained in effect until this February.

Rail Increases Greater

All the companies responding to the survey reported increases in both rail and truck rates, with the rail increases greater in almost every case. According to the commodities, the boosts during the past two years were: 38 percent rail and 10 percent truck, for canned vegetables; 54 percent rail and 45 percent truck, for meats, packing house products and canned meats; 60 percent rail and 40 percent truck, for canned and frozen fish; and 66 percent rail and 40 percent truck, for bakery goods and flour mixes.

The traffic managers of the surveyed food processors were unanimous in their statements that, where time was a factor in the movement, trucks were faster irrespective of the length of haul. It might have been expected that, on the extremely long hauls, rails would have been faster, especially on cross country runs. But apparently the interchange of freight between connecting truck lines has so improved that the only remaining requirement for the truck time to beat the rail time is that there be truck lines running between the origin and destination points.

As an example, the Pacific Inter-

mountain Express (whose operations were described in detail in May, 1947, FOOD INDUSTRIES) moves dry and frozen food products from the West Coast into Chicago and St. Louis, from which there are many truck lines running to the eastern seaboard. Then there is the Associated Transport, Inc., which can move a trailer load without unloading from Portland, Me., to New Orleans, La., in six days by changing tractors at terminal breakpoints in Boston, New York, Baltimore, Charlotte, N. C., and Atlanta.

As an example of the greater speed of truck deliveries, one New Jersey processor of bakery goods and flour mixes stated that, "on the whole, truck delivery is ten times faster than rail on less-carload shipments and twice as fast on carload movements." That company has eliminated all LCL rail shipments up to 600 miles. Other reasons for the switch from rail to truck were delays in delivery and excessive loss on damage claims.

A Michigan shipper of canned fruits, vegetables and cereal food preparations, states that trucks are faster "to all distances." He said that in 1946 "approximately 20 percent of all our shipments were via motor carrier, but in 1948, this had increased to 50 percent."

Distances Increasing

This same company stated that "with the increase in rail rates, we increased the maximum trucking distance from 250 miles to 350 miles and then to 600 miles." This action was due principally to the faster truck service and the ODT loading regulations. The increased rail rates have enabled the truck lines to compete at the greater distances.

Another shipper of fresh and frozen fish, fruits and vegetables, out of Illinois, says: "We have diverted over 10 percent of our traffic to motor carriers in the last two years, because of the rails' increase in rates and slower service. We can get quicker deliveries by truck wherever the service is available. Trucks generally have better equipment to handle frozen foods. Truck claims are few and in most instances are paid in a reasonable length of time."

A chocolate-products shipper in Wisconsin said he could get a quicker delivery by truck, up to approximately 1,500 miles, on about 40 percent of his shipments.

Fluid Milk Shifts

A shipper of fluid milk into New York City said that since June 30, 1946, his freight rates have increased 60 percent, and that these "constantly increasing rail rates have necessitated our diverting a large part of our fluid milk shipments to highway transport. A year ago, 80 percent of this traffic moved by rail. At present, rails are hauling only about 35 percent."

A New Jersey shipper of catsup, relish, beans and similar items, in corrugated cartons and barrels, reports that trucks give a quicker delivery on "all hauls, LTL or TL." As a result this company has increased the scope of its truck deliveries from 1,200 to 1,600 miles.

Time Saved

A Sacramento, Calif., shipper of canned fruits and vegetables loads rail cars to 77,000 lb. for its longest interstate movements. But up to 500 miles, "as much as two to three days time is saved by truck over rail. Intrastate hauls by highway carriers have resulted in faster deliveries, since these carriers can pick up merchandise at our plant at any time. Also the shortage of rail equipment has forced us to practically eliminate rail shipments in the State of California."

An Indiana shipper of meats and meat products and byproducts previously sent only movements up to 400 miles by highway. But in 1948, "the company made diversions to the highway up to 1,500 miles, due to quicker service and lower costs."

"For a time 400 miles was considered a maximum distance for highway transport," says a New Jersey shipper of packaged tea, tea bags and soup mixes. Now, however, "an increasing number of cities is being served with distances extending 1,000 miles from truck terminals. This has enabled us to make additional trucking movements to favorable rate territories, using to advantage stop-off privileges to partially unload for split delivery services."

Eases Competitive Problem

A shipper of fresh meats, packing house products and canned meats in Minnesota declares that the "extensive and continued percentagewise increases in rail freight rates in the past three years have gravely disrupted prior existing competitive market relationships in the livestock and meat industries. We are devoting a determined effort in 1949 toward the correction of these competitive rate disruptions, not the least of which will be an enhanced diversion of tonnage to truck carriers."

The same company also states that while the majority of its shipments move in carloads averaging 28,000 lb., later broken down at distribution points into LTL shipments averaging 450 lb. each, its experience "has shown that truck service can be superior to rail for virtually any length of haul. In 1942," the spokesman continued, "we trucked approximately 4 percent of our total volume. Presently, we are trucking 11 percent. This increase in trucking is attributable to a lesser cost and a more expeditious service."

A large New Jersey brewery's shipping schedule included carload lots of from 50,000 to 60,000 lb., for distances up to 3,000 miles; trailer loads of from 24,000 to 30,000 lb., up to 400 miles; and 6,000 to 10,000 lb. by its own route trucks, up to 40 miles.

Due to rail rate increases of 55 percent as compared with truck increases of 25 percent in the past 2 years, it has "transferred parts of its rail movements to truck and water transportation. Classification changes, damages, and protective service costs were also factors in this case. We now ship up to 1,000 miles by truck and to 3,000 miles by water."

Four Highway Types

The types of highway transportation organizations utilized in this trend toward greater truck distribution of food products include: 1. Regular common carrier trucks running on established routes. 2. Contract carrier trucks running direct to delivery destinations. 3. Limited common carrier trucks running on irregular routes. 4. The food processor's own company trucks operating as private carriers, or by subsidiary company-owned trucking departments or companies.

Most of the regular common carrier truck lines operate a line haul with terminals not over 350 miles apart. At these distances, dusk to dawn overnight runs are feasible. Pick-up trucks are operated from each terminal to collect outbound and deliver inbound less-trailer-load shipments to or from the main line haul.

Full trailer-load pick-ups at the origin city move to the local truck terminal and, without unloading, are put on the line haul with bigger and faster tractors. Again without unloading, these trailers are transferred to smaller local pick-up tractors and finally delivered to destination.

As to rates, most common carriers in all rate territories are parties to bureau tariffs, which requires each to charge the established bureau rates.

In connection with rates, the previously-mentioned New Jersey shipper, who has increased his truck range from 400 to 1,000 miles, stated that, "customer preference and time in transit are among the many factors that influence our selection of highway transport, rather than rail, on movements to the customer's door, where such truck service is available."

This shipper offers one warning: "with the exception of New England, Middle Atlantic States and certain destinations in Southern territory, we are restricted in the movement of volume shipments via highway transport for the reason that, irrespective of

whether the level of rates is comparable, the actual ratings protected must be considered. Hence, a commodity rated fifth class, or 35 percent, in both rail and motor classifications, would move in rail service at 35 percent of the first class rate. In many motor carrier tariffs, however, it is forced to move at the higher fourth class rating, or 50 percent of first class, that rating being the lowest rating protected by the motor carriers in the territory served."

These general comments on rates were given between the survey listings of the various carriers used in highway distribution. The differences between the regular common carrier rates and those of the contract carrier and the limited common carrier are considerable.

How They Operate

As the term implies, the contract carrier does not haul for the general public. He confines his work to the haulage of certain products for certain shippers over certain routes under contract between himself and the shippers. His rates are not subject to the regular published tariff rates of the ordinary common carriers.

The regular common carrier is authorized by the ICC to move general commodities between states and by state public service commissions for intrastate service between specified points over regular routes. The limited common carrier is authorized to transport only specified commodities between specified points over irregular routes.

Limited common carriers operating interstate are, of course, required to publish tariffs and file them with the ICC in the same manner as any other common carrier. Limited carrier rates, however, are not subject to bureau common carrier rates, and the commodities that the limited carrier is authorized to haul outbound in one direction may be entirely different from those allowed on the inbound run. This freedom gives the limited carrier the opportunity to balance his movements with full loads in both directions. In turn, this gives a lower unit cost per ton moved and should result—and usually does—in a lower unit rate charged.

When a food processing company elects to set up an automotive department, a comparison of unit costs between the company's own trucks, and the rates charged by common carriers, contract carriers, or limited common carriers, will determine the most economical system to employ.

The increased truck rates, previously reported, have been those of regular common carriers. Because of the balanced movements and the consequent economy of operation, the increased rates of the limited common carriers have been less.

The Michigan processor, who increased his truck radius of delivery from 250 miles to 350 miles and then to 600 miles, states that the rates of common carriers, which his company employed, increased 30 percent in the last two years, while those of limited carriers increased only 15 percent.

Containers such as cans, jars, boxes, etc., are now trucked almost exclusively by limited common carrier, at freight savings up to 35 percent compared to rail rates. For example, glass jars from an Indiana point are hauled at 32c., whereas other truck rates are 40c. and the rail rate is 43c. Similarly, cans are hauled from Illinois, by limited carrier, at 43c. as compared with 72c. by regular common carrier and 57c. by rail.

For years, the same company received produce by truck from the territory surrounding its plant, but is now receiving similar raw materials by truck from Florida and the Carolinas—mostly at rail rates, but saving the railroad protective service charges, which vary from $75 to $100 per car.

Consolidate Loads

The truckers employed in the above hauls specialize in the transportation of agricultural products and are thus exempt from the rate regulations of the Interstate Commerce Commission. Most of these men own and drive their own tractors and use trailers equipped with mechanical refrigeration units to provide protection for the load without any additional charge.

Geo. A. Hormel & Co., Austin, Minn., meat packer, cites an outstanding contract carrier operation, which "reflects a saving of 35 percent under rail costs." The operation is the consolidation of LCL purchases of supplies in the Chicago area for trailer-load movement to Austin, a distance of 370 miles.

The supplies hauled in this packer's operation are all items incidental to packing house processing. They include casings, bags, chili powder, wire, machinery, steel, washing compounds, lift trucks, paper, flour, office supplies, cheese, and many others. These items originate largely in the Chicago area. They are picked up by a drayman under contract to the Hormel company and held at his Chicago warehouse.

When a trailer load of 27,000 lb. of these materials has been accumulated, an over-the-road contract carrier, with proper ICC authority, consolidates the load and moves it at night to the Hormel plant in Austin. The average road time is 13 hours. From three to five such trips are made weekly.

The contract carrier tractor-trailers are based in St. Paul, Minn., and Freeport, Ill., and are fully loaded both ways. On the return trips, meat is carried from the Austin plant to Wisconsin and Illinois points. The total cost, including the pick-up and over-the-road transportation of these consolidated loads, is 35 percent less than the regular rail, truck, less-car, or less-trailer cost.

Another outstanding example of the use of trucks to haul incoming materials is noted by an Indiana meat packing company, which said: "Probably the most significant change in our transportation has been the increase in the scope of our private truck operation. By a coordination of our deliveries and our purchases, prices being equal and the quality the same, our buying of raw materials is now governed by the ability to procure at a point from which we can transport such purchases in our own vehicles. The savings thus obtained will pay for the cost of the trucks in six months."

Still another example of economy in the use of a food processor's own trucks on incoming raw materials concerns a Sacramento, Calif., fruit and vegetable canner, who uses his own trucks to make San Francisco deliveries FOB shipboard. By employing the same trucks to pick up return loads of raw materials originating in the bay area, deliveries to the cannery are made at small cost to the company.

Saves 15 Percent of Costs

A processor of salted, pickled and frozen fish, in Massachusetts, has saved 15 percent in the cost of incoming raw materials by the use of trucks, mainly through lower truck rates and the elimination of the cost of unloading and trucking from the freight yards to his plant.

A New Jersey processor has saved on the cost of incoming raw materials by specifying common carrier trucks instead of rail, with economies of 20 percent on cans, 20 percent on oil, and about 10 percent on sugar.

Another New Jersey processor of similar items has made no appreciable reduction in outbound shipments by rail, of which approximately 97 percent are full carloads, but has made considerable savings in transportation costs by the use of trucks on his incoming raw materials.

A manufacturer of dessert preparations in upper New York State has made savings on incoming shipments by specifying truck instead of rail. These savings have been effected because smaller minimum shipments could be ordered as well as because of lower truck rates, amounting to approximately 25 percent on one item, sugar.

A SPECIAL FOOD INDUSTRIES REPORT

OPERATOR samples preserves, which are being cooled from 220 to 190 deg. F. in a water-jacketed pan.

JAM AND JELLY MAKING

Quality has been improved, yields increased, costs lowered, and production stepped up through modernization of equipment and the adoption of advanced operating methods. Continuous processing may replace batch operations

E. EVERETT MESCHTER,
Chemist, The American Preserve Co., Philadelphia

Preserve, jam, and jelly making calls for mixing prescribed quantities of sugar with fruit, and then evaporation of the water or otherwise adjusting the soluble solids content. Sufficient peetin and acid (eitric or tartaric) may be added to replace deficiencies of these constituents in the raw fruit to improve flavor and consistency. The addition of artificial flavors or colors is not permitted in preserves or jellies labeled "pure".

Government regulations require that commercial preserves and jellies contain 45 lb. of fruit to each 55 lb. of sugar. Futhermore, the final soluble solids content must be 65 percent in the case of all jellies and preserves made from most tree fruits and 68 percent in the case of berry-variety jams.

Technically, jams and preserves are identical, except that products containing the whole fruit are generally designated as preserves. On the other hand, those with crushed or macerated fruit are generally called jams. Jellies contain juice, without fruit fibre.

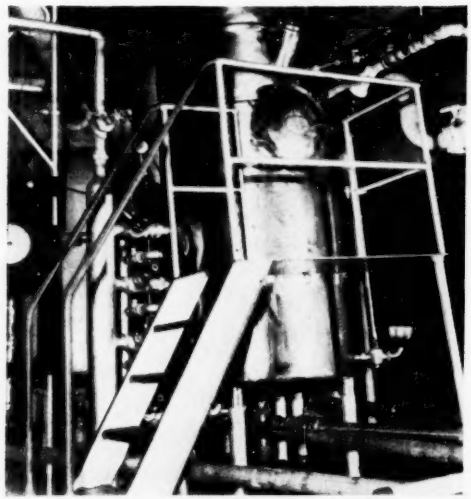
The range of change in formulation is consequently quite limited and, therefore, improvements in quality tend to be concentrated in methods of processing and in design of equipment for production economy, rapid heat transfer, and sanitation.

Industry Trends

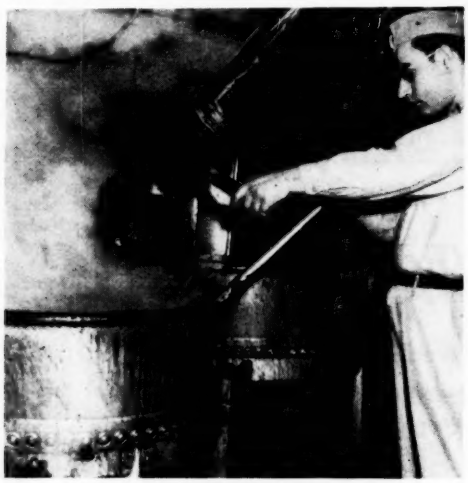
Trends within the preserve industry are now toward modernization of equipment for low temperature handling of fruits—from raw material to the finished product. New materials for the construction of processing equipment are finding their place because they are eliminating metallic contamination and facilitating cleaning.

The following discussion will consider a few of the advancements which are revising the age-old art of preserving into a modern food-science.

Vacuum Pan Improves on Kettle



LARGE stainless steel vacuum pan cooks 2,000-lb. batches, brings considerable reduction in handling of materials.



IN THIS open-kettle cooking, preserves reach high temperatures, which can adversely affect color and flavor.

Physically, the process of preserving is one of forcing sugar into the fruit, and forcing water out of it. Bacteria and yeasts will not grow in a medium where the sugar concentration is above 65 percent. Consequently, if the sugar content inside the fruit is raised to this figure or above, the product will keep indefinitely, without spoiling or fermenting.

Mold growth, on the other hand, is not appreciably retarded until the sugar concentration is above 75 percent. But molds are only surface contaminants, and preserves can be freed from such contamination by sterilizing the head space of the container. The remaining contents within the jar will be permanently sterilized due to the osmotic pressure of the sugar solution.

Preservers are interested in the penetration of sugar into fruits for a reason other than keeping quality—that is, to distribute the fruit throughout the preserves as uniformly as possible.

On this score, it is noted that the specific gravity of a sugar solution of 68 percent is about 1.3. And the specific gravity of the fruit juice within the fruit is about 1.1. Unless sugar penetration takes place, an even distribution of fruit within the jar of preserves will be difficult. The fruit will float to the top of the jar, while the bottom of the jar will remain clear. If the specific gravities of the fruit and the surrounding sirup are equal or nearly so, the fruit will remain suspended long enough to permit the pectin to set and to prevent further separation of fruit and sirup. Equalizing the distribution of fruit throughout the finished product in this manner will greatly contribute to the appearance of the preserve.

Economic Advantage of Sugar Inversion

The inversion of sugar plays an important role in the manufacture of high quality preserves and jellies. When sucrose and acid are heated together, the sugar breaks down into one molecule of dextrose and one of levulose, with an increase in density by the incorporation of water. Thus, 100 lb. of sucrose, when completely inverted, will yield a solution containing 105 lb. of invert sugar (dextrose and levulose.)

Preservers can take advantage of this increase in density by finishing the water-evaporating process at a point just below the 65 percent level. Then, by continued heating, they can raise the density of the product to 65 percent by inversion.

The economic advantage of this procedure must be weighed against the color and flavor destruction of the product due to prolonged heating. Of course, with some additional equipment, inversion of the sugar can be carried out at another point in the process—before the fruit is added.

Averting Sugar Crystallization

Some inversion is necessary to prevent crystallization of sucrose in the product. Sucrose solutions at 68 percent solids content are stable at room temperature. But, when a preserve or jelly is opened for consumption, surface evaporation frequently raises the sugar concentration above 68 percent. When this happens, the sucrose crystallizes.

Invert sugar, however, is more soluble than sucrose. And an invert sugar content of about 20 to 50 percent is desirable for preserves and jellies. A higher content may cause the dextrose to crystallize. And since the inversion process continues slowly, even at room temperatures at the pH of fruit preserves (3.0 to 3.5), the initial invert sugar content should not be higher than 50 percent.

When evaporation is carried out at atmospheric pressure, the temperature is generally sufficiently high and the cooking time is long enough to attain proper invert sugar levels. In vacuum processing, however, sugar must be heated in an acid medium long enough to produce proper inversion. Or, the invert sugar content may be adjusted by the addition of totally or partially inverted sugar sirups.

Control of Finishing Point

Hardly more than two decades ago, the finishing point of a batch was judged by the "sheeting" test—a crude but worthy index of the concentration of pectin, sugar, and acid in the mix. This was to give a pre-indication of the "set" of the jelly upon cooling.

Here is how this test was conducted: The paddle was removed from the batch, and the mix was allowed to drip from the paddle. If it ran off in a sheet instead of a stream, it was an indication that gelation would take place upon cooling.

Gradually, this method of determining the finishing point has been replaced by the use of temperature indicators—since solutions of the same concentrations with the same sugars will have identical boiling points at the same pressure.

Recently, even these thermometers have been outmoded by automatic temperature control units that aid the preserver in attaining greater uniformity in soluble solids content of the finished product. These units minimize human error, and within very close limits, shut off the steam supply to the kettle when a predetermined temperature has been reached.

To show the economic importance of close finishing-point control, suppose we have a batch of grape jelly cooked to a soluble solids content of 65 percent and a finished weight of 300 lb., and that an operator will control the cook with a hand thermometer. At a normal atmospheric pressure of 29.92 in. of Hg, ingredients in the grape jelly will elevate the boiling point of water approximately 8 deg. F., or the batch will have a finishing point of 220 deg. F.

If the operator allows the batch to rise to 220.4 deg. F., the soluble solids content will be 66 percent, and the yield 295.4 lb.—a loss of 1.54 percent. With material costs of approximately 10c per lb. of finished product, this 0.4-deg. override would cost 46c. With a daily production of 50 batches, this would amount to $23.

Temperature controls are now available which can reproduce their measurement and control to within 0.25 deg. F. and some to even 0.1 deg. F.—a soluble solids control better than 0.25 percent.

Maintaining Quality

Naturally, no preserve can be better than the fruit from which it was made. Therefore, the acquisition of top-quality, fully ripe, well-colored raw material is essential in the production of quality preserves. Subsequently, the problem of quality rests squarely on the ability of the equipment and processing procedures to retain the color and flavor of the natural fruit. Here, rapid cooking, filling, and cooling are important. Also vital is use of equipment that cannot cause metallic contamination.

Preserves are generally made from frozen fruit, so that throughout the year they will have maximum color and flavor. In the frozen state, fruit does not materially lose its color or flavor over a period of a year or more. But a preserve kept at room temperature may not have a satisfactory shelf life of more than six months.

To study the mechanism of color changes in strawberry preserves, the National Preservers Association instituted research under the direction of Z. I. Kertesz, of the New York State Agricultural Experiment Station at Geneva, N. Y.

Seek Curb On Berry-Color Loss

The anthocyan pigment in strawberries has been extracted and crystallized. A method for the determination of the red color has been developed to a point where known additions of the pigment could be detected with remarkable accuracy. The behavior of the pure crystallized pigment in various chemical environments is being studied to note what types of reactions adversely or protectively affect the color. It is hoped that some means of retarding the loss of color in the finished preserve may be found through data resulting from these studies.

As might be expected, the rate of loss in color is closely related to the temperature at which the preserves are stored. Holding at low temperatures greatly lengthens storage life. But at present, this method of prolonging the shelf-life of preserves does not appear to be economically feasible.

In general, it has been estimated that the velocity of chemical reactions double with every 18 deg. F. rise in temperature. Consequently, color is being destroyed or changed at the boiling temperature of preserves over 200 times as fast as when the preserves are stored at room temperature. It seems expedient, then, that processing and cooling rates be given foremost consideration if color degradation is to be minimized.

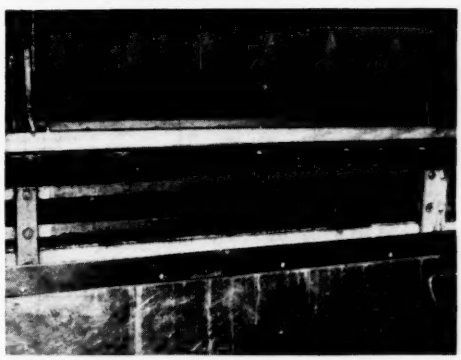
Need to Cool Preserves Rapidly

The mechanism of color changes in fruit products is not clearly understood. Some changes are due to heat deterioration, such as the chemical action of acid on levulose which

New Quick Cooling for Quality

CONVEYOR takes jelly jars from capper and feeds them through opening into continuous conveyor-cooler unit.

HERE, jars emerge from cooler, which is equipped with cold-water jets to spray-cool jars to 100 deg. F. or below.



CLOSEUP of the cooler unit shows sprays in action.

causes sugar browning. Others are due to oxidative changes, such as the browning of peaches and apricots. But it can be clearly shown that all of these changes are minimized if temperatures are kept low.

In line with the need for rapid cooling of the preserves to maintain their color, several types of cooling units have been devised. These units consist of a long, wide conveyor, traveling at only a few feet per minute. While moving on the conveyor, the jars are sprayed with a fine mist of cold water (which may be used again after re-cooling) from nozzles under the ceiling of the unit.

These units may also be employed for pasteurizing the head space in the jars to prevent mold growth. In such an installation, the first portion of the conveyor-cooler is equipped with jets of steam or hot water above 190 deg. F. to heat the caps and head space sufficiently to destroy mold spores. Then, the succeeding sections of the conveyor are equipped with cold water jets to spray-cool the jars to 100 deg. F. or below.

Various economies and processing advantages are claimed by equipment manufacturers. But whatever the type of cooling system used, rapid cooling of the product to a temperature below 100 deg. F. and preferably below 65 deg. F. before packing it into cases is essential to good **quality.**

Heat Exchangers Step Up Production

Increasingly popular with the fruit processing industry is rapid heat exchange equipment. These units combine economy of operation and strict sanitation, as well as quick and efficient heat exchange.

Primarily adapted for rapid heating and cooling of fruit juice and sirups, it can also be used for fruit purees and macerated products. Tubular and table types of exchangers can be used wherever particle size of suspended matter makes use of the plate equipment unfeasible.

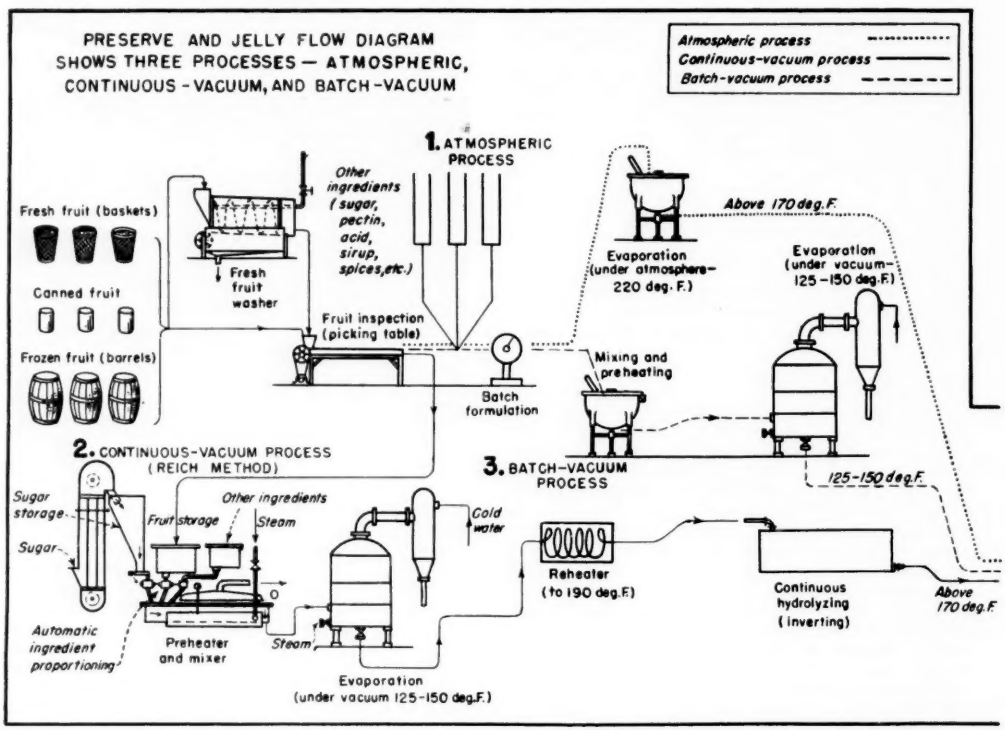
Some preservers use exchangers to preheat the preserve and jelly ingredients before evaporating them in a kettle or vacuum pan. Passing of sugar sirup through an exchanger to attain a temperature of 200 deg. F. or above before adding the sirup to the kettle, materially cuts down the cooking cycle, thus greatly increasing the rate of production.

Heat exchangers can be used in the preparation of fruit juices and purees for making jellies and jams. Hot juice from the juice press and hot puree from the finishing machine or pulper can be passed through an exchanger to reduce their temperatures to 100 deg. F. or below in a matter of seconds. This step materially aids in preventing alteration of the delicate fresh fruit flavor and aroma.

Continuous Processing

Recently, revolutionary methods of jam and jelly manufacture have been investigated. And it appears that the time-honored batchwise method may be replaced by continuous processing. It is claimed that in the Reich continuous process (U.S. Pat. 2,185,064), a production of 120,000 lb. per day can be attained with less labor and higher product quality than by batch methods.

In this method, ingredients are automatically proportioned from bins or tanks into a pre-heater. Here, they are thoroughly mixed and dissolved. Next, the mix is continuously fed into an evaporator, where the proper amount of moisture is removed. Then, the product is continually withdrawn from the evaporator, reheated to about 190 deg. F., and held at this temperature in the inversion tank to attain the desired percentage of sugar inversion. Finally,



filling, capping, and cooling are accomplished in the usual manner.

After the instrument controls are set at the desired values, the process is virtually automatic, requiring but one operator to make continuous checks and maintain proper settings.

Glass Washing

Most preservers receive glass in fiber cases directly from the glass factory weirs, and bacteriologically it should be considered clean. However, modern quality standards demand that all glasses be washed with hot water immediately before they are used to remove any carbon, dust or other foreign matter.

For this purpose, equipment has been developed to wash glasses continuously and feed them directly to the filling machine. In units of this type, the glasses are dumped from shipping cases, right side up, onto the unscrambler. Glasses are fed single file into the inverter section. While the glasses are upside-down, they are washed with jets of hot water (160 to 180 deg. F.). Detergents are not necessary.

A blast of hot compressed air blows out excess water, and the glasses are again righted and ready for filling

New Materials and Design

Development of new types of metals and new designs of sanitary equipment are constantly improving the rate of heat transfer to cut process times and minimize color and flavor losses. Copper-clad stainless steel sheets are now available. It is claimed that these sheets have heat-transfer rates almost similar to copper. They are also sanitary and have the same corrosion resistance as stainless steel.

Newer methods of feeding steam to jacketed equipment uses channels for the steam, increasing its velocity past the surface to be heated, and thus raising the heat-transfer rate.

This equipment is generally fabricated by corrugating one sheet and attaching it to another flat sheet by continuous welds along the "valleys" of the corrugations. Steam is fed by a manifold into the semi-circular tubes thus formed. In this way, the quantity of heat, as well as placement of the heat on the kettle or tank, can be closely regulated.

Stainless steel vacuum pans are becoming increasingly popular. Under atmospheric pressure, a preserve at 68 percent soluble solids content will have a boiling point above 220 deg. F.—a temperature at which color and flavor may be adversely affected. On the other hand, under 27 in. of vacuum, the same product will boil at about 122 deg. F. When cooked at this low temperature, harmful effects on color and flavor are greatly reduced. Since the temperature differential between the walls of the kettle and the boiling point of the preserve is increased, the rate of evaporation per unit of heating surface is correspondingly increased.

Vacuum processing also has the added advantage that it can be used to make batches as large as 2,000 lb., thus reducing materials handling. This method has still another benefit. It will increase the rate of sugar penetration into the fruit during the pressure changes when the vacuum is released.

Flavor Retention and Recovery

Studies at the Eastern Regional Research Laboratory of USDA have stimulated widespread research on flavor retention and reclamation. Technics that have been successfully used to obtain full-flavored volatile apple concentrate may possibly be employed for other varieties of fruits. These concentrates greatly improve flavors of finished products by preventing vaporization-loss of volatile flavors during the evaporation process.

New technics in concentrating juices by freezing and then separating the ice crystals prevent flavor losses that are encountered when juices are concentrated by heating. In general, concentration by freezing is more expensive than concentration by heat, due to higher percentage of losses. But the quality of the product is far superior. Generally, the juice is frozen in a continuous tubular freezer and the concentrated juice is separated from the ice crystals by centrifuging (Further information on freezing concentration can be found in November 1947 FOOD INDUSTRIES, page 80.)

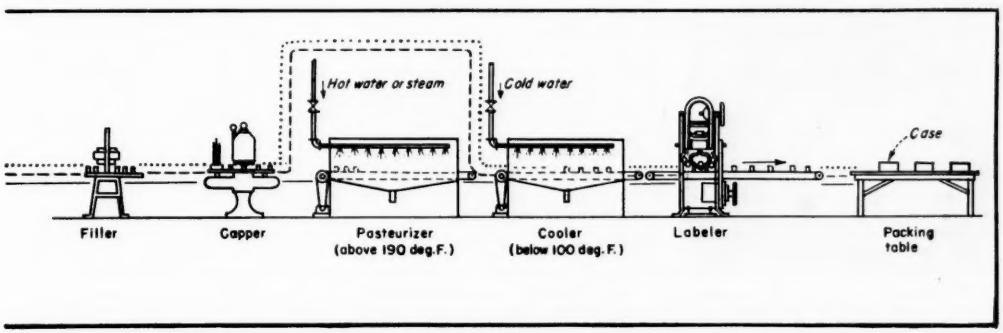
Low Methoxyl Pectins

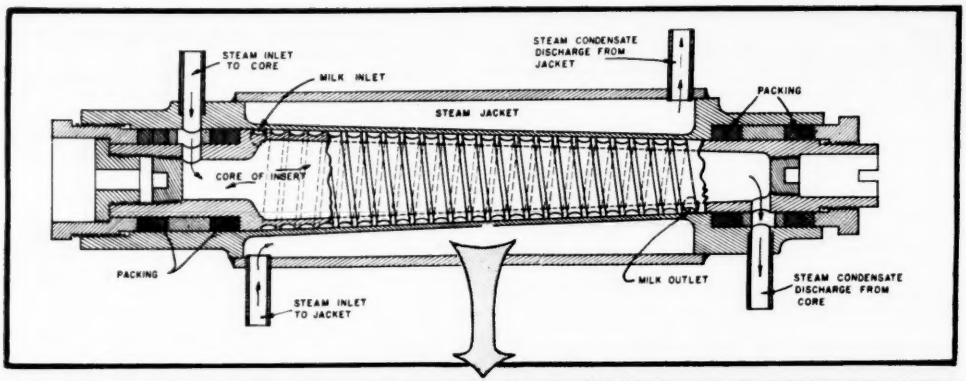
Still another aspect is the opening of an entirely new field of preserving with the advent of low methoxyl pectins. These pectins possess the unique property of gelation without sugar and with calcium salts. Aspic type salads of fruits and vegetables with only sufficient sugar for sweetening purposes can be canned and marketed ready-to-serve.

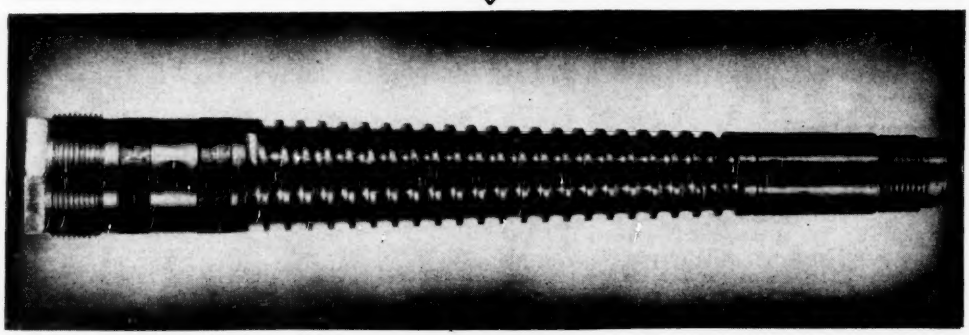
Adverse effects of storage have, it is true, contributed to the slow development of these products. But, when these difficulties are ironed out, gelled salad or dessert preparations will find their place on grocery shelves.

Standardization of raw materials contributes greatly to the maintenance of uniform quality in preserves, jams, and jellies. At the present time, there is no standard for pectin strength, and accordingly a committee for the development of a uniform pectin grading procedure has been formed under the sponsorship of the IFT. It is hoped that a uniform method for standardization can be developed by which all types of jelly pectin can be fairly graded.

Maintenance of high nutritive value, delicious taste, and appetizing appearance in preserves and jellies will go far in keeping them popular in the diets of both children and grownups.



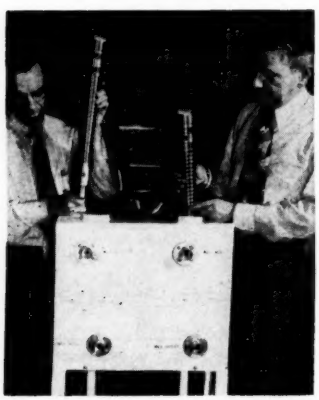




ASSEMBLY AND COIL INSERT of BDI heater. Top: Section drawing shows helical-coil-formed passage through which liquid food product travels, also steam inlets to core and jacket, and condensate discharges. Above: Helical insert, showing gaskets and steam inlet. Unscrewing of nut at left starts withdrawal of core from outer housing.

New Heat Exchanger Reduces Filming

It uses principle of turbulent flow in helical groove for heating liquid foods. Steam is applied to inner, outer surfaces to achieve high temperatures



UNIT for small milk or cheese plant. Photo shows ease of disassembly.

F. P. HANRAHAN, C. F. HUFNAGEL and B. H. WEBB
Bureau of Dairy Industry, Agricultural Research Administration, USDA, Washington, D. C.

A new type helical groove heat exchanger, designed for high temperature treatment of milk products—up to 300 deg. F.—is now being used successfully in the Bureau of Dairy Industry laboratories in Washington.

Other units built according to the BDI design are in use for commercially pasteurizing and sterilizing milk. The heater should also be useful for pasteurizing or sterilizing soups, fruits and vegetable juices, and it may be employed, as required, for heating water.

High-Temperature Heating

Early investigations in the Bureau of Dairy Industry indicated that the quick heating of fresh milk to temperatures above boiling caused changes that can be used to advantage in numerous dairy manufacturing processes.

When milk temperatures remain below the 165 deg. F. range for short periods of time, no objectionable changes occur in the flavor, color and filming characteristics. At higher temperatures, filming becomes a serious problem, and flavor and color changes increase in proportion to the log of the holding time.

Viscosity also increases as the coagulation point of the milk is approached. Development of excessive viscosity at this point might be expected to obstruct the tubes of a high temperature heater. It has been shown recently, however,

that the severe agitation to which milk is subjected in a high velocity heater, prevents a significant increase in viscosity, even at the point of coagulation.[1]

And formation of milkstone can be greatly decreased by preheating milk prior to the final high-temperature heating. For example, milk that has been previously heated to boiling may be reheated—and to higher temperatures—without seriously coating the heating surfaces. Formation of a deposit becomes progressively greater as the temperature to which the milk was previously heated is lowered, reaching a maximum with raw milk.

Since the trend in milk processing is toward high-temperature short-time heating (not only for pasteurizing and forewarming, but also for sterilization before aseptic canning), additional investigation work was decided upon. But no suitable, small, efficient, sanitary heat exchanger was available with which to conduct the experiments. For this reason, the new type BDI heater was designed and built.[2]

The heater consists of an outer housing into which a tapered core is inserted (see section drawing). A precision fit between core and housing is used to form the tube-like helical passage through which the milk flows.

Heating is effected by steam, applied to the inside of the core and in the jacket of the housing. Rise in temperature of the milk varies with the rate of flow and pressure of the steam (See Fig. 1).

The unit contains 136 sq. in. of heating surface and has a capacity of 6.69 cu. in. Length of the helical passage is 12 ft. When milk is pumped through the unit at a rate of 1,000 lb. per hr., it flows through the heating passage in 0.87 sec., with a velocity of 13.7 ft. per sec.

Representative experimental data on performance of the heater are given in Fig. 2. The increase in pressure required to force the milk through the heater, indirectly represents the build-up of film on the heating surface.

Filming is greatest at the higher, or sterilizing, temperatures. At pasteurizing temperatures, no significant deposit occurs. In event of any appreciable deposit, the unit may be dismantled and cleaned in a few minutes.

In its present form, the heater should be useful as a pasteurizer for small-market milk plants or cheese factories where a capacity of 2,000 to 3,000 lb. per hr. is sufficient. It is well adapted to institutional research work on dairy products where milk is to be heated as high as 300 deg. F. Bigger heaters or multiple units could be built to handle large milk supplies.

Acknowledgment and References

The authors wish to acknowledge with thanks the assistance rendered by D. H. Williams during collection of data presented in Figs. 1 and 2.

1. B. H. Webb and C. F. Hufnagel. BDIM-Inf.-61, June 14, 1948.
2. Francis P. Hanrahan. U. S. Patent 2,445,115, July 13, 1948.

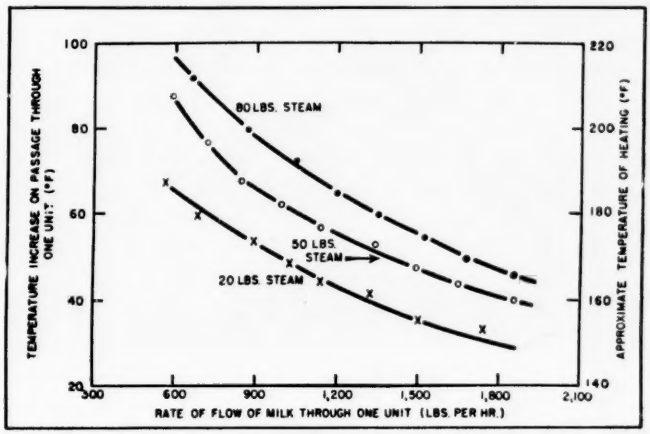


FIG. 1. TEMPERATURE RISE through BDI heater depends upon rate of flow and steam pressure. Raw milk entered unit at 122 deg. F. in above tests.

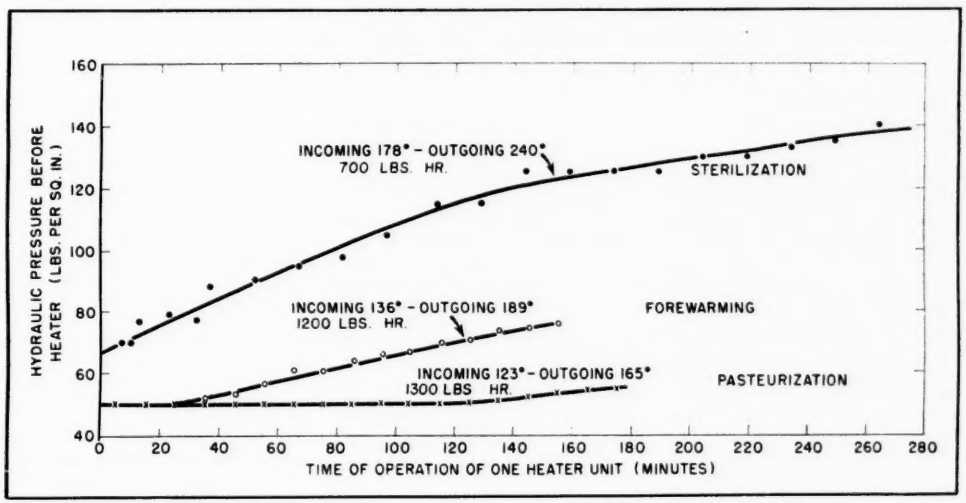


FIG. 2. INCREASE IN PRESSURE required to force milk through heater at a given rate of flow is an indication of build-up on heating surfaces. Note difference in pressures for pasteurizing, forewarming, and sterilizing.

These Top Quality Products Plus Promotion Explain . . .

How Dole Built Marketing Leadership

It teamed industry advertising with company developments in production and processing to win nationwide demand for pineapple products

C. R. HAVIGHORST
Associate Editor, "Food Industries"

To the food industry, the true marketing history of canned pineapple seems more like fiction, unparalleled by that of any other food commodity. Rarely has a food been so favored. In the 45 years it has been on the market it has never experienced a condition of actual and universal market saturation. The industry has experienced some carry-over years, due mainly to limited distribution and domestic economic conditions in the U. S. However, since 1932, a constantly increasing consumer demand has absorbed each year's production and promises an even higher rate of consumption when increased supplies become available.

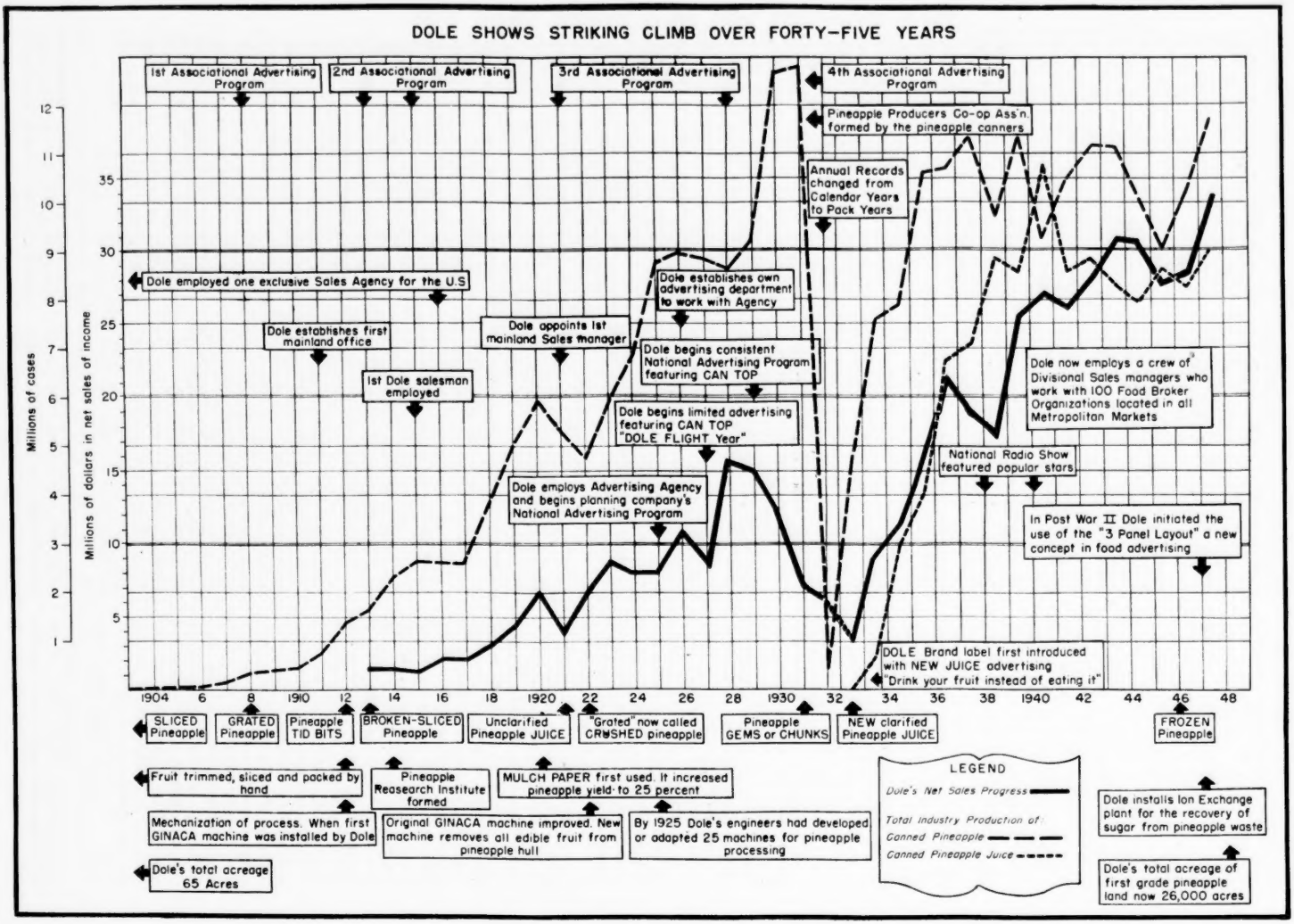
Pineapple is a product with unusual marketing potentialities. It has a plus factor, surpassing that of any other fruit—that of versatility. It may be frozen or it may be canned as whole-slices, broken-slices, chunks, tidbits, crushed or as a juice. It is also combined and canned with other fruits making such products as fruit cocktail and fruits for salad. Grocers have found pineapple increases the consumer unit sale inasmuch as this fruit combines well with other foods which often are selected as companion purchases. A recent survey found that only a very small percentage of consumers dislike pineapple.

Developed Through Research

Originally, pineapple canners were not aware of these factors. While many of them were inherent in the fruit, all of them had to be developed and refined by scientific and engineering research and, subsequently, their varied consumer uses ascertained by home economies. The high quality pineapple of today is the product of evolution. This began with the original, hand-prepared sliced product. It progressed through a period of experimentation until today there are five kinds of canned pineapple, pineapple juice and frozen pineapple chunks.

Simultaneously, during this evolution period of product development and increasing production, distribution of the product had to be broadened and more consumers convinced that they should eat canned pineapple. People were then eating other fruits and feeling no lack because they had not tasted this fruit.

In 1902, The Dole Hawaiian Pineapple Co. published its first prospectus in which James D. Dole stated, "The canning of pineapple will extend the market for this fruit into every grocery store in the United States." The com-


DOLE SHOWS STRIKING CLIMB OVER FORTY-FIVE YEARS
Millions of cases
Millions of dollars in net sales of income
1st Associational Advertising Program
2nd Associational Advertising Program
3rd Associational Advertising Program
4th Associational Advertising Program
Pineapple Producers Co-op Ass'n formed by the pineapple canners
Annual Records changed from Calendar Years to Pack Years
Dole employed one exclusive Sales Agency for the U.S
Dole establishes first mainland office
1st Dole salesman employed
Dole appoints 1st mainland Sales manager
Dole establishes own advertising department to work with Agency
Dole begins consistent National Advertising Program featuring CAN TOP
Dole begins limited advertising featuring CAN TOP "DOLE FLIGHT Year"
Dole employs Advertising Agency and begins planning company's National Advertising Program
Dole now employs a crew of Divisional Sales managers who work with 100 Food Broker Organizations located in all Metropolitan Markets
National Radio Show featured popular stars
In Post War II Dole initiated the use of the "3 Panel Layout" a new concept in food advertising
DOLE Brand label first introduced with NEW JUICE advertising "Drink your fruit instead of eating it"
1904 6 8 1910 12 14 16 18 1920 22 24 26 28 1930 32 34 36 38 1940 42 44 46 48
SLICED Pineapple
GRATED Pineapple
Pineapple TID BITS
BROKEN-SLICED Pineapple
Unclarified Pineapple JUICE
"Grated" now called CRUSHED pineapple
Pineapple GEMS or CHUNKS
NEW clarified Pineapple JUICE
FROZEN Pineapple
Fruit trimmed, sliced and packed by hand
Pineapple Reasearch Institute formed
MULCH PAPER first used. It increased pineapple yield to 25 percent
Mechanization of process. When first GINACA machine was installed by Dole
Original GINACA machine improved. New machine removes all edible fruit from pineapple hull
By 1925 Dole's engineers had developed or adapted 25 machines for pineapple processing
Dole's total acreage 65 Acres
LEGEND
Dole's Net Sales Progress
Total Industry Production of:
Canned Pineapple
Canned Pineapple Juice
Dole installs Ion Exchange plant for the recovery of sugar from pineapple waste
Dole's total acreage of first grade pineapple land now 26,000 acres

pany has long since seen the fruition of this vision and propheey. But, in 1903, when the company farmed only 65 acres of pineapple land and its first pack amounted to only 1893 cases, this was indeed a long-range vision. Today the company can produce more than this entire first year's output within a period of 12 minutes. Nine pineapple canning companies now annually produce 20,000,000 cases of pineapple, including juice, valued at more than $70,000,000, of which the company packs approximately 40 percent.

Chronological Progress

The most significant parts of this history are (1) the manner in which the industry cooperated in associational advertising programs; (2) the development of Dole's increased production output, the origination of new pineapple products and the advances in agricultural and processing engineering; and (3) the manner in which Dole consolidated its position in domestic markets with sales and advertising programs which placed its products in a dominant position in national distribution. Any concept of the manner in which the company attained national distribution of Dole products must be based on the company's and the Hawaiian pineapple industry's history.

By 1913 the company's success in the pineapple canning business had attracted 11 new firms to enter this field. Total production had swelled from the original 1893 cases to over 1½ million cases in 1913. During this period Dole began production of four pineapple products: The whole-sliced, grated, tidbits, and the broken-sliced. Preparation of the product for canning was done largely by hand until 1912, when Henry Ginaca, an employee of the company, built the first mechanical means of coring and sizing pineapple. The machine, which has since been refined and perfected, still carries the name "Ginaca."

First Economic Crisis

Marketing histories show that most young industries are destined to overproduce, perhaps many times, during their initial growth. Eventually a point is reached where an equilibrium between production and consumption is established.

Prior to 1908 this industry was totally unorganized and completely lacking in conception of what quantity of their products the then existing markets would assimilate. With little previous history to guide them, packers had to plan their future packs largely on a speculative basis. And, because of the length of time it requires for pineapple to mature for harvest, about 20 months, most of these estimates had to be on a basis of two years in advance. And, having invested in the raw material, these early canners picked it all hoping that their mainland sales representatives could sell it.

No serious carry-overs had occurred to this date. Consumption seemed to be keeping pace with production. Most of the pineapple canners had some sort of sales representation on the mainland. Dole used one sales agency, the original *Hunt Bros. Packing Co. (San Francisco), to sell their entire output, the greatest proportion of which was for buyers' labels. No organized advertising or merchandising had been done. Distribution was spotty and limited to the few markets in which pineapple had been initially introduced.

The panic of 1907 and its resulting disruption of economic conditions on the mainland plunged the industry into this first crisis. Consumer buying power dropped to a low ebb and it was not surprising that when the industry packed over 100 percent more pineapple in 1908 than in 1907, it was entirely too much for the then existing markets to absorb and so, as a result the industry was faced with glutted markets and falling prices.

Build Consumer Demand

Having packed 65 percent of this 1908 total, Dole was in the most serious position of all the canners. Yet all the industry faced prospects of varying degrees of economic disaster unless this pack was moved into consumption. The condition demanded a promotional budget of sufficient amount to quickly increase consumer demand and broaden distribution for the product.

Under the sponsorship of Dole, the industry formed the Hawaiian Pineapple Packers Assn., composed of seven of the principal canners. This cooperative advertising venture, the first of its kind and which was later to be imitated successfully by industries on the mainland, was financed with a budget of $50,000. A six months' schedule of advertising in six national magazines was purchased. This program, featuring the product only (no brands were mentioned), helped to move the surplus pineapple into consumption.

The fact that the industry could ride through this emergency on a modest advertising budget seemed to lend substance to Jim Dole's propheey of 1902. But, it had taught the company that it was imperative to broaden the distribution of their products. This realization brought Dole to establish its first mainland sales office intended to develop a closer liaison between production and distribution.

Output Keeps Spiraling

At the end of the decade and still lacking in knowledge of what quantities of pineapple existing markets would consume, the industry continued its increasing spiral of production. And, again, in 1913, the canners faced a condition of overproduction. Total production had grown now to 1,667,122 cases. Having learned an individual lesson from previous overproduction, Dole's output this year was only about 35 percent of the total. For this emergency the canners developed a budget sufficient for a three-year advertising program. Experience had shown that the initial 1908 six months "hit-'em-and-run" program provided only temporary relief and did little towards broadening distribution. This budget amounted to $98,000 and it was destined for use as follows: 1913, $26,000; 1914, $39,000; and 1915, $33,000. Featuring the product only, this program stimulated movement of surplus stocks into consumption and, to a limited degree, further extended the distribution of pineapple in the U. S.

The results of these two cooperative programs had demonstrated that, although they moved the total stocks into distribution, their action was of an indiscriminate nature. Lacking the additional force of a coordinated selling program, this national advertising had the effect of establishing for Dole an undesirable and sometimes uneconomical distribution pattern. It was apparent that to realize on its investment Dole would have to have a sales force on the mainland. Utilizing the advertising of the product, pineapple only, salesmen could, under the direction of a sales manager, control the growth and direction of Dole's distribution in a planned, step-wise manner. So, in 1915 the company employed its first salesman—the nucleus of its present sales force.

Technical, Engineering, Agricultural Progress

During the five years following the termination of the 1913-15 associational advertising program the industry's production increased more than 103 percent. The preceding sporadic cooperative advertising programs had accomplished the movement of surplus stocks but then their temporary force had been expended. Lacking in persistence and in size their effect resulted largely in the creation of a haphazard although broadened distribution and a somewhat increased consumer acceptance than was before in existence. So, again, in 1920 these limited markets overflowed with canned pineapple.

* Hunt Bros. Packing Co. packed fruits and vegetables. Their main offices were in San Francisco, Calif. They sold part of their production under their own label and the remainder for buyers' labels. This company used food broker organizations largely for their sales representation in a limited number of metropolitan markets in the U. S.

Fortunately, production declined in 1921-22, but the industry having a surplus of stock began another associational advertising program. Profiting through the experience gained from previous hit-and-run advertising the canners this time planned their longest cooperative program, 1921-28. The company, now fully aware of the need for close coordination of its marketing program with production plans, severed its sales connections with Hunt Bros., and, in '21, established its first accredited sales manager in San Francisco, with plans to augment their sales force under his direction.

The industry evidenced an early interest in scientific research. In 1914 it had formed a research station, which is now known as the Pineapple Research Institute, located at the University of Hawaii, Honolulu. The Institute has played an important part in developing basic agricultural research and its applications to pineapple growing. The company, also aware of the values of research, engineering, and quality control was the first to establish its own scientific departments and laboratories.

Develop Machinery

Always the leader in scientific or engineering developments in the pineapple industry, Dole had developed or adapted 25 machines for processing this fruit. Many of these were made available to other canners on a low royalty basis or entirely free. Dole was one of the first to express the beliefs (1) in any branch of the food processing industry, a company's economic potential is to a large degree relatively concerned with the quality of product its competitors produce; (2) that to assist the other pineapple canners to produce a higher quality product would react to the benefit of the entire industry because (3) it would develop a uniformly better consumer acceptance of canned pineapple.

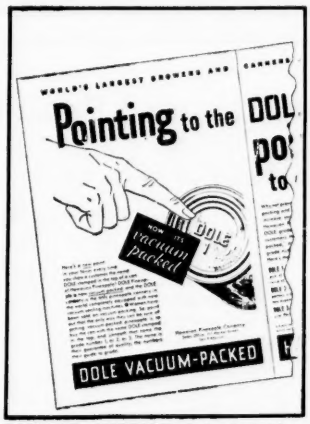
By 1922 there was little desirable pineapple land left in the Island regions. Still supremely confident of the future of this industry in that year, James Dole negotiated the purchase of the entire Island of Lanai. This provided the company with an additional 14,800 acres of fine pineapple lands.

The company's output in 1926 had grown to 3 million cases representing 34 percent of the total pack of the Islands. Its gross sales income had risen to nearly 11 million dollars. The problem of adequate raw material supply had been solved, at least temporarily, through the purchase of Lanai.

On the premise that food-broker organizations provided the most economical and satisfactory sales representation, the new sales manager began the development of what is now one of the most effective sales organizations of its kind in the food industry. He chose only top flight brokerage firms to represent the company. His sales plan required that Dole's brokers make regular retail follow-ups, after sales to jobbers, in order to expedite movement of the product through both these sales channels and into the ultimate consumer's hands.

"Dole" Gains Acceptance

With such a large proportion of the company's pack being sold for buyers' labels, no promotional effort had been put on the several labels owned by the company. Up to this time, it was felt that sales for buyers' labels were of much more importance than the development of a single company label. But production and consumer acceptance of Dole pineapple now had reached a point where it became injudicious to continue on this basis. The company determined to develop its own label.



CAN-TOP IMPRINT helped initiate "quality" ads exploiting best consumer uses for different grades.

In a carefully devised plan, utilizing an entirely new advertising idea, Dole began a limited advertising program in 1927. This was the year of the "Dole Flight" when James D. Dole offered a prize of $10,000 to flyers making the flight from San Francisco to Honolulu. It was the beginning of a promotional effort that was to influence greatly the entire marketing of the company.

This new advertising idea centered around the trade-name "Dole", which was stamped in bas-relief on the top of every can of pineapple produced by the company. It was another kind of cooperative marketing venture, inasmuch as it added to the selling force of buyers' labels.

Pineapple, in those days, was packed in three grades: Fancy, choice and standard. The can tops were stamped "Dole 1", "Dole 2" and "Dole 3" to identify those grades. The idea was designed to acquaint consumers how to tell the Dole-packed products from any others, no matter what label the can carried. The advertising theme featured the story of James D. Dole and the part he played in this industry. The idea of checking the quality of pineapple by referring to the can top caught on immediately with consumers.

Sales Go Up—Then Down

The general sales momentum for canned pineapple now seemed established. In 1928, Dole packed more than 3,250,000 cases, sold them for nearly $16,000,000, and earned a net profit of $2,363,752. In 1929, production was so short that Dole had to prorate deliveries 15 percent below sales. Stocks on hand dropped to a bare minimum. It was during this year that the company began a consistent national advertising program featuring the can-top idea.

But this boom turned to a bust in 1931. It was during this depression year that the industry packed the striking total of nearly 13,000,000 cases of pineapple. Unusually good growing conditions, and a speculative attitude on the part of the canner-growers, resulted in production of crops in 1930–31 that represented an all-time high for the industry. Dole packed nearly 5,000,000 cases of this total, sold them for only $7,211,367, and showed a deficit of nearly $4,000,000.

During this turbulent economic era, Dole gained favor with its customers by offering protection of floor stocks against price declines and promptly honoring all such claims. The maintenance of a fair but rigid sales policy, throughout the life of the company, has created an enviable prestige for Dole.

In 1932, the industry and the company changed their method of recording packs and income figures—from the calendar year to the pack year. As a result, the total pack for 1932 shows a drop to about 5,000,000 cases. Two of the nine companies had failed in 1931. All the companies lost money. Dole's loss in '32 was about $8,500,000. But under the impetus of the industry's largest cooperative advertising program, stocks moved into consumption and the way was prepared for a rapid recovery.

This fourth association advertising program was brought into play during this disastrous period under the management of the Pineapple Producers Cooperative Association. A budget of $1,500,000 was spent in advertising and dealer education. The campaign featured the health appeal of canned

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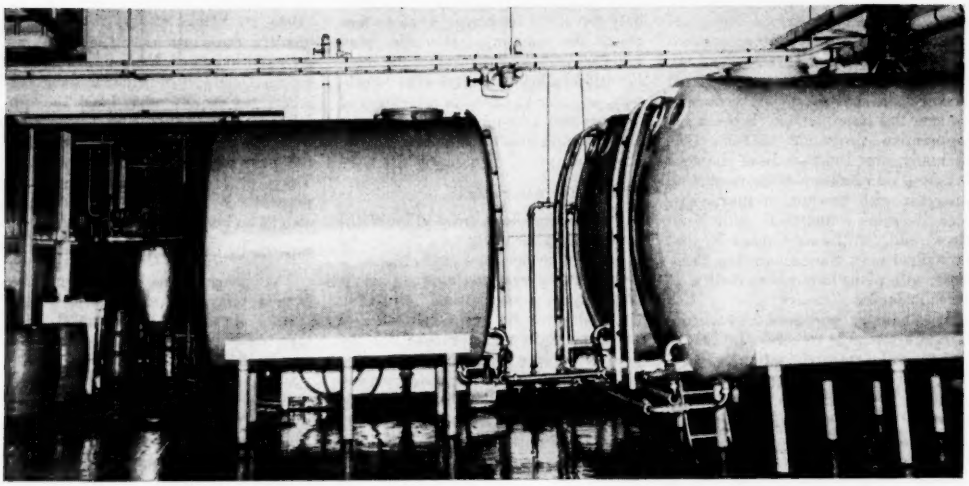


SLEEK VINYL surfacing on these whey tanks of Knutsen Creamery, Visalia, Calif., curbs many types of deterioration.

Coatings Against Corrosion and Deterioration

Sturdy resistance is provided when vinyl plastics are applied to equipment, walls, floors and ceilings of dairies and other food processing plants

R. J. McMAHON
Amercoat Division,
American Pipe & Construction Co.,
Los Angeles, Calif.

Corrosion of equipment and deterioration of floors, walls and ceilings of dairies and other food plants may be greatly reduced by the proper application of plastic protective coatings developed especially to resist milk and its derivatives. The best of these coatings are based on vinyl resins, which not only are complete proof against these products, but also resist cleaners, sterilizing agents and moisture, and in addition inhibit the growth of bacteria.

In addition to the dairy industry, plastic coatings are used in many other food processing industries—as in the meat packing industry for lining bacon processing boxes and edible oil tanks, with the approval of the Meat Inspection Division USDA. They are also employed to line tanks for fruit and vegetable juices, sirups, sugars and beverages.

Many Problems Encountered

In order to understand fully the problems encountered in the development of satisfactory protective coatings for dairies, it is well to consider the various types of equipment used and characteristics of plant exposure.

In *washers* used to cleanse milk bottles and cans, caustic and chlorine or hypochlorite sterilizing agents are used. Temperatures between 140 and 180 deg. F. are involved. The interior of the washer is subjected to constant high humidity and vapors. The exterior is exposed to a caustic spray and drip. A corrosion problem also exists under the hand holes and bearings due to constant leakage.

Cappers, fillers, homogenizers, cream separators, churns, pumps and conveyors are subjected to milk products, lactic acid, cleaners and sterilizers. Corrosion is also caused by frequent washing with hot water and steam, constant high humidity, and dampness.

Pasteurizers are exposed to milk at 149 to 150 deg. F. and to abrasion and alkalis during cleaning. Milk spillage, steam, and cleaners are damaging to the exterior.

Whey tanks are exposed to lactic acid and moisture. Raw milk holding tanks must be protected from fresh milk, washing with caustic, and chlorine sterilizers.

Water tanks have 100 percent humidity at normal temperatures. *Refrigeration equipment* and *brine tanks* are exposed to sodium and calcium brine, condensation and ammonia.

Drains, floors and *stairs* are subject to dampness, spillage of milk and milk products, lactic acid, strong hypochlorite solutions and abrasion caused by heavy foot and equipment traffic. On *ceilings* and *walls*, steam and constant high humidity cause bacteria and fungi growth.

Plastic Coatings Developed

For over 10 years, the Amercoat Division of the American Pipe & Construction Co. has been active in the development of protective coatings for use in the dairy industry. During this time, many types of plastic materials were tested to find a suitable base. Vinyl resins were found to be completely resistant to, and insoluble in, milk and its products. Using them as a base, a coating was developed, particularly suitable for maintenance use in dairies. Tough and abrasion resistant, it also resists cleaners and provides an excellent protection against corrosion for long periods of time.

First Experiment

Since sanitation is such a vital factor in dairy plant operation, extensive experiments were conducted in an attempt to determine whether surfaces coated with this product would harbor bacteria or fungi.

Resistance to the mechanical removal of bacteria from a plastic coated sur-

THOROUGH COVERAGE marks the application. Cheese vats, piping,—walls, ceiling, too—are safeguarded by coatings.

face as compared with a glass surface was first determined. Five 6 x ½ in. test specimens were coated with the Amercoat* and then smeared with a broth culture of *Serratia sp.* for a distance of 2½ in. from one end. Five glass test tubes were treated in the same manner. When partially dried, the inoculated surface area of each of 4 specimens and 4 test tubes was washed under running tap water for 30 seconds. Specimens and test tubes were then rinsed in 50 ml. of sterile distilled water and allowed to dry. The fifth specimen and fifth tube were not washed but were held as controls.

From this point, the procedure was similar to the APHA tentative method for the examination of drinking glasses, viz: The treated areas were each swabbed with a moist, sterile swab which was then washed out in 10 ml. of sterile saline solution. Bacteria counts were made by plating the saline solutions in nutrient agar.

Results (given in the accompanying table) indicate that bacteria can be removed mechanically from the plastic-coated surfaces as easily as from glass surfaces.

Second Experiment

Resistance to the mechanical removal of the fungi from a cement concrete surface coated with Amercoat, as compared with an uncoated concrete surface, was next determined. The surface of a plastic coated cement block was inoculated with 1 ml. of a suspension of *Tricophyton rosaceum*, spread evenly over a circular area of about 400 sq. cm. This was allowed to stand moist for 30 min. before it was wiped off with dry cotton. The block was then washed under running tap water for 2 min., rinsed with 100 ml. of sterile distilled water, and allowed to dry.

When dry, the inoculated area was covered with a thin layer of Sabouraud's dextrose agar, poured above the congealing point. The surface of an uncoated cement block was treated in an identical manner. And as a control, the inner surface of a 100 mm. Petri dish was inoculated with the fungus, dried but not washed and then covered with the same culture medium. The two cement blocks and the control dish were placed in a large covered dish and incubated at 82 deg. F.

After two weeks' incubation, the control plate showed an abundant growth of the fungus, and about a dozen colonies were visible on the uncoated block. But no growth of the fungus appeared on the plastic-coated block.

These results indicate that fungi are readily removed by mechanical means from a cement surface coated with Amercoat, although they resist removal by the same method from an untreated surface.

Selecting and Applying Coatings

There are baked phenolic coatings that provide smooth, sanitary, hard surfaces which are fully resistant to high temperatures. These are excellent for the interior of pasteurizers and other equipment where high temperature is a factor.

For interior and exterior surfaces of equipment not exposed to high temperatures, and for floors, walls and ceilings of dairy plants, vinyl resin coatings have proved highly satisfactory. In addition to being resistant to, and insoluble in, milk and milk products, they are odorless, tasteless and non-toxic.

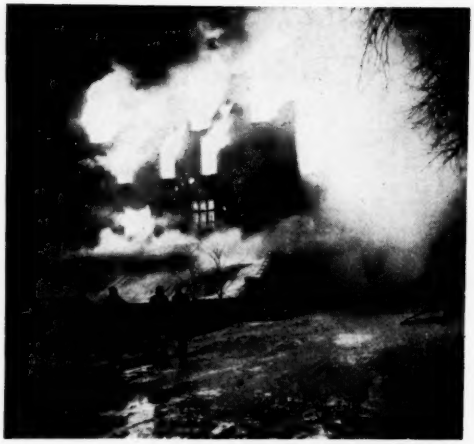
These economical coatings are applied in a number of thicknesses, by brush or spray. Coats dry in from 8 to 12 hr. without the necessity for baking. For use in confined areas—such as refrigerators, where the odor of the solvent normally used is objectionable—there has been developed a coating of pigmented vinyl resin dispersed in water.

Surface preparation, as always, is the key to successful application of a coating, regardless of the excellent resistance properties it may possess. proper surface preparation can be obtained by various methods. These may involve such expensive processes as acid etching concrete or sand blasting metal, or less complex procedures such as wire brushing and washing with commereial eleaners. For certain metal surfaces which have become oxidized, primers are available that can be used in place of the costly sand blasting.

PLASTIC COATED SURFACES Held Very Few Bacteria. Comparison Made With Glass

Sample No.	Total Bacteria	
	Plastic-Coated Specimens	Glass Test Tubes
1	150	90
2	90	240
3	90	330
4	70	10
Control	244,000	256,000

* Amercoat, a plastic coating recommended for exterior and interior surfaces of equipment, floors, walls and ceilings. Coatings are offered in several types for specific uses.



This plant disaster could have been curbed....

....by employees trained for fire emergencies

How to Keep Your Plant From Burning Down

Program to eliminate hazards, provide needed equipment, and build employee teamwork is termed a "must" as food plant fires mount

MARIO deMATTEO
Fire Protection Institute, New York City

Fire safety is vital in good food plant management.

While the food industries are constantly striving to improve production and efficiency, protection against fire is, too often, given only minor consideration. In this, there is great danger—for neglect of fire safety improvement in plants can make all other improvements futile.

Figures of the National Board of Fire Underwriters tell a challenging story: During 1948, fire losses throughout the country topped $711,000,000—highest in history.

These latest figures have not yet been broken down by industries. But during 1947 approximately 4,500 food processing plants were either damaged or entirely destroyed by fire, and the measurable costs exceeded $40,000,000! Food plant managements *can* do something about it.

Three-Part Program

Granted, no fire protection expert can tell a food plant management that with a few "do's and don'ts" his plant will be completely protected. However, experts agree that if management will spend the time and effort to develop—and enforce—a fire-safety program, the chances that the plant will be destroyed by fire can be reduced 80 percent.

The problem is how to achieve the highest degree of fire-safety. The answer should come from and be implemented by, top-level management.

Generally, defenses against fire should incorporate these three main divisions: (1) Fire-resistant construction, (2) elimination of hazards, (3) adequate protection.

A poorly constructed building invariably suffers heavy damage once a blaze in the building gets out of control. Unprotected wall openings, large floor areas, open stairways, and open wall spaces all offer flames free routes.

A fire-resistant building features construction that denies fire freedom to travel from section to section or floor to floor. Fire-stops between exterior and interior walls prevent flames from spreading and weakening the superstructure of the building. Enclosed stairways and elevator shafts are formidable barriers to fast growing fires. Fire doors between plant sections help to confine blazes.

Management interested in obtaining fire-resistant construction should consult reputable building contractors and allow them to survey the plant. Contractors' recommendations may mean the difference between severe and negligible losses.

An organized system of detecting and eliminating fire hazards is recommended by the Fire Protection Institute, and it has now been adopted by many plants. In these plants, a crew of employees volunteer to inspect for fire hazards at regular intervals. These inspectors are trained for the job. They make tours of the plant with a check list. Fire hazards or safety violations are reported, and corrective steps are taken immediately.

Most Common Cause

According to the National Fire Protection Association, the chief common cause for fires in the food industries is spontaneous ignition of combustible material. These fires that "start by themselves" are reported to be responsible for more than 22 percent of the fires in the industry.

Foods such as grain, corn oil, cod liver oil, cocoanut oil, feed, brewers grains and oleo oil are subject to spontaneous ignition. Oils are particularly hazardous when they spill from containers and impregnate rags, dirt and lint.

Conditions under which material can ignite spontaneously can be minimized. Good housekeeping will get rid of dirt, rags, and lint soaked with oils. Feed and grains stored in small piles in ventilated rooms can reduce such fires.

Other common hazards—like the misuse of electricity, careless smoking, heating defects, and the irregular use of flammable heating—can be eliminated by regular inspection and enforcement of safety rules.

The so-called "special" fire hazards in the food industry are principally found in ovens, dryers, kilns and other heat-producing units. Most of the fires originating in or around such equipment are caused by overheating. Some fires are caused by blowers drawing sparks, some by inadequate clearance of combustible material, and still others by defective installations.

Grinding mills, pulverizers, and similar equipment also have special fire hazards. Foreign material which finds its way into stock used in this equipment can be responsible for fires. Other fires in or around this equipment can result from friction sparks—usually caused by defective electrical equipment.

Fryers, kettles and similar cooking units present another danger. Combustion originating in accumulations of grease on ducts or canopies and ignited by stray sparks is not uncommon. Open kettles permitted to overheat cause many of the fires, as do spillings of drippings on open flames.

The fire prevention division of a food plan should be just as well organized as its shipping or accounting departments. Employees should be thoroughly trained to use fire equipment. And the equipment itself should be well maintained with periodic inspection.

Fire brigades formed in various plants are constantly proving their value. A Yonkers, N. Y., plant which, prior to organizing a company fire brigade, reckoned its annual fire losses in four and even five figures, now totals the yearly fire losses in mere hundred of dollars.

The need for such programs is specifically brought home by mention of a few actual losses. The records show that on October 20, 1948 a cannery in Monterey, Calif., was destroyed by fire. Damages totaled $75,000. Earlier in the same month a pancake flour mill in Didsbury, Ala., was gutted by fire, with property losses set at $100,000. And on October 31, a salt company in Texas was rocked by an explosion and losses soared to $250,000. Then, in Sioux City, on December 10, a defective hog-singe machine caused a $7,000 packing plant blaze. These few recent cases evidence food plant vulnerabilities.

Equipment and Its Use

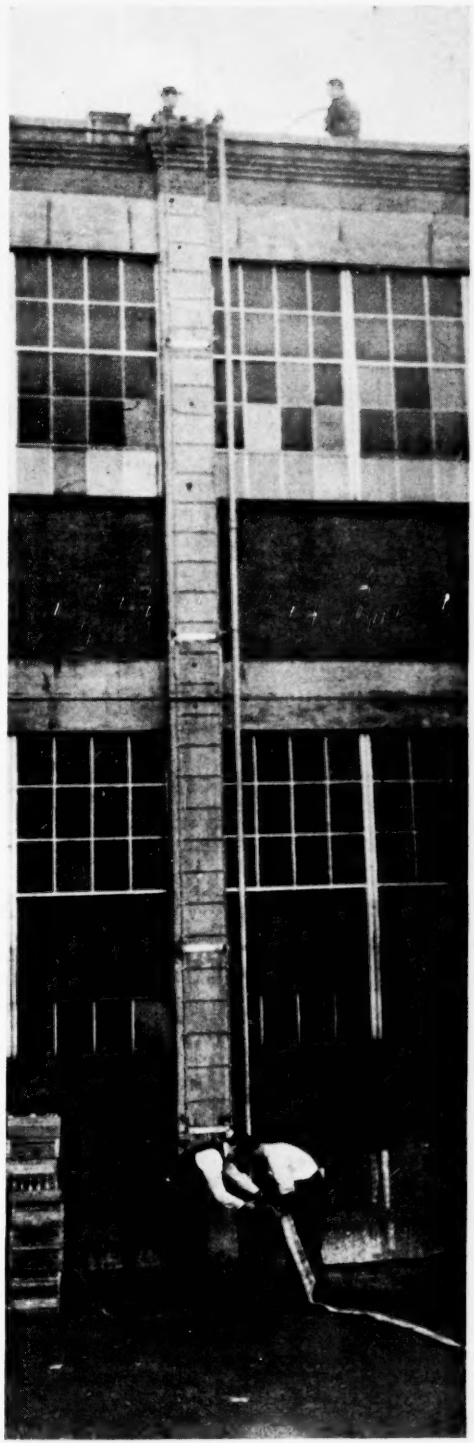
In considering fire-fighting apparatus, it is essential that such equipment be adequate to cope with any emergency. Fire extinguishers, wheeled and portable, approved by the Factory Mutual Laboratories are recommended. Plant safety managers should determine the number of extinguishers needed and report unprotected areas.

It is important that the proper, approved fire extinguishers be installed in a particular risk area. Fires that may originate in wood, paper, rubbish, cloth and similar combustible material, should be attacked with extinguishers which contain soda and acid, or foam.

Areas where fires may originate in oil, grease, fats, other flammable liquids and solids should be protected by equipment containing foam, vaporizing liquids, carbon dioxide or dry chemicals. These agents smother flaming liquids.

Sections housing large electrical motors, generators or transformers should be protected by extinguishers whose agents are non-conductive. Devices loaded with carbon dioxide, dry chemical or vaporizing liquids are advised.

Once the plant is properly protected by emergency fire fighting equipment, a program to train men to use the equipment should be initiated. Through this program, there should be assurance that a fire call from any part of the plant will bring the fire-brigade, armed with equipment, to the location of the blaze in a matter of seconds.



COMPANY BRIGADES, properly coached and equipped, can act quickly to prevent ruinous fires. Here, employees on ground connect hoseline with pipe leading to roof, where their teammates attach another line, thereby eliminating difficult job of carrying hose up ladder.

LUNCHEON MEATS come off line. Introduced in late '30's, they now account for nearly half of canned meat output.

Canned Meats Win Front-Rank Status

For canner, they have become profitable items, dependable in balancing meat production. For consumer, they are now versatile convenience dishes

DAVID S. BURT
Benton & Bowles, Inc., New York City

Note: The following article is based on information gathered in personal studies by the author, together with supporting data supplied to FOOD INDUSTRIES *by leaders in the field—The Editors.*

Production of canned meats has increased sharply. And an analysis of the uptrend quickly tells why.

Primarily, nine factors are responsible: (1) Retail prices are lower than for fresh meats; (2) past military and lend-lease demands forced packers to increase their productive capacity; (3) quality of canned meats has been greatly improved; (4) distribution costs are low; (5) shrinkage does not occur during distribution or in subsequent home cooking; (6) these canned meats provide new markets for less popular cuts; (7) they tend to stabilize production, distribution, and consumption; (8) packers have an added sales advantage in the identification of their brands of canned meats; and (9) consumers are provided with convenient, easy-to-prepare items.

This year, nearly half the families in America will eat a canned meat meal at least once a week. That statistic is more astonishing than it seems, for in 1939, only one wife out of five ever served meat from a can. During the last ten years, a significant fluctuation in consumer buying habits has brought canned meat into four out of five homes. While 1948 found total meat production at 23 percent above the prewar level, output of canned meat was riding a full 170 percent higher (see graph).

In 1948, 1,100,000,000 lb. of luncheon meat, chili con carne, corned beef hash, Vienna sausage, deviled ham, and scores of other meats, were shipped from American canneries. This amounted to 5 percent of our total meat production. And many leading packers assert that cans may claim double this share within a few years. This year, the per capita consumption of canned meat (on a dressed meat basis) will be about 8 lb. By way

of comparison, consumption of fresh lamb will be only about 4 lb.

Since 1945, the trend has displayed some interesting aspects. While the census of canned meat consumers has shown relatively little significant change, those consumers have found more uses for canned meats. They are featured in planned dinner menus more often. Fewer housewives consider them as mere emergency snacks or "substitutes" for fresh meat.

A far greater variety of canned meats is entering the home kitchen. In 1945, canned ham luncheon meat was a prima donna in the field. Today, it shares the field with a number of close rivals, particularly beef products. Sales of chili con carne have advanced remarkably.

Price Advantage a Factor

A prime reason for tripled production of canned meats during the past ten years is that they have enjoyed a price advantage during the postwar inflation period. Unsatisfied demand lifted fresh meat prices, but the marketing picture for canned meats was of another color.

During wartime, plentiful raw materials influenced canners to rush new machinery into their plants and gear their production up to an annual rate of 2,000,000,000 lb. Military demands had to be met, not to mention lend-lease demands from our allies, including a huge volume of canned *tushonka* to help feed Stalin's armies.

Came VJ Day, and meat canners were loath to slow down. With vast production set-ups, they ushered a bountiful flow of canned meats into a highly competitive market. Here—and almost here alone—the consumer enjoyed a buyer's market. Prices hung relatively low. At one point last year, a brand of canned hamburger sold for 59c. a pound in New York City, while the price of a comparable grade of fresh hamburger rose to 95c.

There are those who predict that canned meat sales will fall off with the lowering of fresh meat prices. Yet, the balance of evidence denies this argument. Throughout the '30's canned meat sales increased even while fresh meat prices were riding at bottom depression levels. Moreover, a 1948 survey has indicated that people who consider canned meats more economical than fresh are no more numerous than those who view the processed products as more expensive.

Many brands of canned meats were good buys in the inflation days of 1948, and a close examination shows that they should remain so even in more normal times. This price advantage becomes evident to anyone who bothers to weigh meat after it has been cooked and boned at home. With canned meat, a pound bought is a pound eaten. But "kitchen shrinkage" (elimination of bone and fat, and evaporation in cooking) claims from 25 to 50 percent of the fresh-meat poundage the housewife buys.

In 1939, a food price analyst demonstrated kitchen shrinkage with a roast of beef. The meat cost 38c. a pound, but the amount he could actually eat was worth 78c. a pound.

Thus in terms of "costs per edible portion," canned meats would appear to undersell fresh. But this can only be asserted with reservations. It would take a thorough research project to decide the question. There is variation according to product. Canned luncheon meat evidently undersells the comparable meat from which it is produced. But canned ham is sold purely on a luxury basis, and many of the best selling canned meats—corned beef hash, vienna sausage, beef stew, and deviled ham among them—have no counterparts on the fresh meat counter.

Many canned meats, moreover, include "fillers"—sauces, cereals, vegetables, and so forth—which remove any basis for comparison. These are not necessarily inserted to "stretch" the product. Often they serve as binders, and may provide additional nutrients. But in any case they enhance the product with bulk-appeal which satisfies the shopper's desire for economy.

How is it that canned meats are an economy buy? Processing costs (including local distribution) may range from 7 to 20c. per lb., according to one New York packer. With this added cost, economy of canned meats would appear questionable. But these processing costs are counterbalanced by a series of advantages over fresh meat in distribution.

First, canned meat is compact. It permits many storage and freight economies, and it requires no refrigeration. The saving becomes clear in terms of a standard freight car, which holds about 54,000 lb. of canned meat, but only 21,000–27,000 lb. of fresh meat. Accordingly, railroad lines have given canned meat favorable rates, a second economic advantage.

Take the case of a packer who ships meat from St. Louis to New York. On this run, he pays 86c. a hundredweight on canned meat. To ship hogs, he pays $1.05 a hundredweight. Dressed fresh meat, moreover, will cost him $1.42, and he must also pay $5.75 per ton for icing and a switching charge of $1.02 per car each time the refrigerator car is iced. Finally, the packer who ships fresh meat has not only to pay for the weight of bone and fat shipped but also labor needed to handle it.

Fresh Meat Shrinkage Higher

Both packer and consumer will ultimately pay for a decided loss in the shrinkage of fresh meats. Its exact extent is difficult to measure, but one packer estimates that such shrinkage accounts for 10 percent of the meat that leaves the slaughter house. Part of this loss is spoilage, generally assumed to claim about 1 percent. A

Exceptional Variety of Canned Meats Helps Build Popularity

1. Bacon
2. Beef a la mode
3. Beef, corned
4. Beef, corned beef, and roast beef hash
5. Beef, dried beef
6. Beef and gravy
7. Beef loaf
8. Beef roast
9. Beef steak and onions
10. Brains
11. Chili con carne with beans
12. Chili con carne without beans
13. Chop suey
14. Frankfurters
15. Frankfurters, barbecue sauce
16. Goulash
17. Ham a la king
18. Ham, chopped
19. Ham, deviled
20. Ham, spiced
21. Ham, whole, half, quarter, (requires refrigeration)
22. Hamburgers
23. Liver loaf
24. Liver spread
25. Luncheon meat
26. Meat balls
27. Pigs' feet
28. Pork and gravy
29. Pork, corned
30. Pork loaf
31. Pork spiced
32. Potted meat
33. Sauerbraten
34. Sausage, bulk, pork
35. Sausage, cocktail
36. Sausage in oil
37. Sausage, link, pork
38. Sausage, vienna
39. Scrapple
40. Spaghetti and meat balls or meat sauce
41. Steak and gravy
42. Stews: beef, Brunswick, Irish, kidney, lamb
43. Tamales
44. Tongue, lamb
45. Tongue, lunch
46. Tongue, pork, tongue spread
47. Tripe
48. Veal
49. Veal loaf
50. Veal and noodles

second factor is evaporation, which "nibbles" at meat whenever it is exposed to non-refrigerated air—say, in delivery trucks whose doors are often opened.

Shrinkage continues at the retail store. Here, it may claim as high as 4 to 8 percent, due to evaporation, drippings, moisture, and blood left in platters. Another loss at the retail end is the time and labor involved in trimming fresh meat, with the footnote that the men behind the meat counter are generally not as efficient as the professional trimmers in meat canneries.

For all these reasons, retailers must put a mark-up of 18 to 35 percent on fresh meat. On the other hand, canned meat is so easy to handle, stock, and sell on a self-service basis, that the retailer finds a lower-range mark-up suffices — 12 to 25 percent.

The packer also has to allot more of his employees' time to distributing fresh meat. Perishable fresh meat can only be stocked by the retailer in limited daily volumes, depending on his refrigerator space and turnover. The packer's salesman has to phone the retailer at least once a day and visit him about twice a week to maintain the daily supply.

Canned meat is far more economical to distribute. It is generally handled through a jobber who only needs to replenish the retailer's supply about once a month.

Economic Leveler

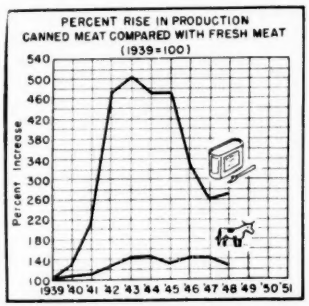
Not many years ago, the foreleg of the hog was almost a drug on the market. Hams, loins, spareribs, and bacon were profitable sellers, but the foreleg (picnic) contained more tendons and fat than ham and brought a low price. This was particularly true of "heavy hogs" whose picnics were too large a selling unit for ordinary family consumption. At times, the price of picnics sank so low that they were unprofitable to sell.

Canned luncheon meat has since become a popular food and erased this problem. Picnics are now processed to produce a multi-purpose canned food and hence command a premium and enjoy a stabilized demand throughout the year. To every farmer who raises hogs, this has the effect of a price support. A larger portion of the hog the farmer raises is profitable to the packer who buys it. Obviously, the farmer receives a better price for his hog, thanks largely to luncheon meats, though not to them alone.

Canned meats have opened many new markets for other sections of the animal carcass. Pork brains, for example, are difficult to cook at home, and enjoy little popularity in most areas of the country. Several packers, however, have found a good outlet for brains by canning them and shipping them to southern states where they are popular. The same profitable technic finds a market for beef tripe.

Pork packers have leveled out the distribution of pork sausage by canning it for sales during the summer when it is difficult to sell fresh. Canners have learned to "make a silk purse out of a sow's ear" in many other ways. They have concocted delicious, vitamin enriched patés and spreads from meat byproducts for which there was no market previously.

The leveling influence of canned meats also works to even out the month-to-month output of the meat industry. The farmer has always brought a large proportion of his livestock to market in the late fall and early spring. While this custom has a sound economic basis, its inevitable result has been the seasonal peaks and valleys, characteristic of meat production.



AFTER PEAKING during war, when they were in high demand for armed forces, canned meats are now running a lofty 170 percent over 1939.

In 1948, meat production fluctuated between 215,000,000 and 400,000,000 lb. per week. Yet, the weekly requirement for meat remained relatively level at 280,000,000 lb., and a changing pattern of supply and demand has resulted. Canned meat obviously becomes a factor in leveling out this pattern.

Naturally, the meat packer wants to store some of the meat he slaughtered in the peak season, rather than unload it all on the market at once, thus weakening the demand for it. He can store it by canning or by refrigeration. Canning is the more economical. It enables him to withhold some of the meat he slaughters during the peak season and offer it on the market during the summer when fresh meat sales are at their lowest and canned meat sales at their highest.

Canned meats, therefore, have helped to stabilize prices. It may be added that they may also tend to stabilize employment in the meat industry. Some packers have raised plant efficiency by refrigerating meat during the peak season, and then canning it during the summer when business is traditionally slack. This enables them to keep more employees working year 'round.

In this way, canning has brought efficiency to an industry that earns only a fraction of a cent on every pound of meat it sells. And it provides brand identification to packers whose products are otherwise sold unlabeled seven times out of ten.

Cans have moved many of the packer's products to the grocer's shelf and self-service supermarkets, where the packer benefits by the advertising space on labels. Brand identification has been a historic problem of the meat packer. And among the solutions which modern packaging has offered, canning may rate as the most important.

All these factors help give canned meat a firm economic foothold. Yet, the feeling runs strong among packers that the rising tide of canned meats should be attributed more to convenience than to economy. Housewives like to save time as well as money.

The View Ahead

Such economic advantages are building a promising future for canned meats. Packers can be counted upon to promote them for their double value as economic levelers and profitable byproducts. Housewives can be counted upon to accept them as a way to save time and energy in a busy world. For this reason, the American Meat Institute, the Can Manufacturers Institute, and individual packers have promoted sales of canned meats forcefully. Large scale research effort, moreover, is expended on new processing technics to improve its flavor and texture.

Looking ahead, the canner's goal will be to increase the planned use of canned meats. A series of surveys by Elmo Roper has shown that a large number of people still view canned meat as a snack or a sandwich filler. They rate only corned beef hash and corned beef as main course dishes. This insight into public opinion has not filled meat canners with pessimism. On the contrary, the Roper surveys have shown them where they may point tomorrow's promotions with confidence. Canned meats are already selling well as emergency menus. But as main course dishes, they present a new field for profitable advertising.

Since the war, meat canners have exploited this main course idea. Statistics to date have shown progress which, if not sensational, marks a steady advance. Slowly, the American public is swinging to the viewpoint that canned meat is not merely a substitute for something better, but a source of hearty eating to write into the weekly family bill of fare.

We Think . . .

▪ Closing of Marginal Plants Is Handwriting on the Wall

The inevitable is beginning to take place on a scale noticeable to those following the fortunes of the food processing industries. We refer to the closing of marginal plants—those whose efficiency is too low, and whose costs therefore are too high, to meet competition in a tightening market.

No less than 52 flour mills are reported to have been shut down in the past year. A large proportion of these mills represents plants brought back into production when the peak demand for export flour developed after the war. It is not unlikely that these mills are permanently out of operation.

Lest this picture appear unduly serious, we hasten to point out that the capacity of the closed mills is only about 7 percent of the industry's total.

Some biscuit bakeries, candy plants and canneries also have shut down. In some instances, this action was taken because present building inadequacy prevented conversion to modern and more efficient equipment.

Some wholesale cake bakeries are operating on a dangerously narrow margin of profit because a decline in the market demand necessitated cutting the production volume. That, in turn, means that the remaining production volume has to carry an extra share of overhead expense.

These few instances of economic difficulty in the food processing field demonstrate the vital importance of reducing operation costs. Domestic consumer buying power is not likely to increase in the months ahead. In fact, the odds are better than even that it will decline somewhat. Add to this the fact that the export market for processed foods declines as food production abroad increases, and it becomes clear that present difficulties are no passing phenomena.

We have pointed out previously the accelerated trend in the application of advanced food plant engineering among progressive companies. This trend will cut those companies' costs enough for them to take business away from less efficient operators. The only way to protect your plant is to climb aboard the cost-cutting bandwagon.

▪ Sterilization by Pressure Is of Scientific Interest Only

Hydrostatic pressure, like vacuum, often has attracted the fancy of the uninformed as a method of food preservation. Being the more easy to manage, vacuum has attracted the larger share of attention, as many an unwise investor has discovered.

High pressure has been little explored as a bacteriostatic agency—largely, one suspects, because of the cost of apparatus. But why use high pressures, even if they should prove effective as a method of producing sterility?

Heat and cold seem to be firmly entrenched in their respective fields of usefulness as the most economic food preservative agencies extant. Nevertheless, a small body of evidence which is accumulating indicates that high pressure may some day have potentialities as a preservative. While that day seems to be a very long way off, and more likely to be preempted by some form of radiant energy, it is interesting to follow scientific progress.

Claude E. ZoBell and Frank H. Johnson (*Journal of Bacteriology* 57, 179, 1949) have shown that many of the more common bacteria become permanently unable to reproduce after exposure to 600 atmospheres (about 9,000 psi.) for periods up to four days.

An oddity is that certain pressure-resistant bacteria are in existence. They grow better under 400 to 600 atmospheres than under 1 atmosphere. Their newly discovered ability has resulted in coining the name *barophilic* to describe their apparent liking for a very high-pressure environment.

If the day ever comes when pressure processing is practical, it seems likely that the barophiles will be the spoilage organisms bedeviling technologists. Fortunately for our hypothetical futuristic food processor, the native habitat of the barophiles seems to be only the deepest places in the ocean—12,000 ft.

▪ Bread Hearings Show Change Is Needed in Proceedings

Adoption of new standards of identity for foods is jeopardized by the current bread standards hearing. The whole concept of standardized foods is threatened. It appears that the Food & Drug Administration must take cognizance of this situation promptly, or some very fundamental difficulties are going to become insurmountable barriers to further progress.

The trouble started in the bitter controversy regarding use of chemical additives in bread as "softeners," emulsifiers, antistaling agents, and for other related purposes. So long as the discussion pertained to questions of toxicity and safety in the use of proposed additives, the proceeding was in order.

But the bread hearings have gone far beyond this. They have been allowed to become a virtually endless discussion of what the housewife expects to buy as bread, and whether the use of certain additives might become either deceptive or an economic cheat. In general, these two questions are legitimate. But their treatment at the hearings has been an atrocious mismanagement, which disregards the whole concept of formulation of standards of identity. The abuse of the proceedings which has been caused or permitted by F&DA is real reason for concern. It rivals, perhaps excels, the gross impropriety of the sugar controversy that burdened earlier proceedings needlessly.

Certain additives were recommended by some firms as substitutes for other components of bread, which are sometimes used and sometimes not. We think this unwise, and if all bread were expected to contain certain minimum quantities of eggs, milk solids, and shortening, then there

might have been a point to the protracted arguments on this question. But we do not believe that even the most zealous food official can justify the wrangling regarding dietetic merit that occurred. And still less does it appear reasonable to use the *Congressional Record* as a means of implying that bakers are going to cheat their customers if they are given a chance.

It is a gross injustice to the baking industry to assume that if a modified formulation were possible there would be a stampede of bakers to use it, regardless of the dietetic value of the product. Official regulation that assumes such disregard of the public welfare by industry is most unfortunate, and wholly unwarranted.

We do not think that F&DA intended to assume that position or to make such a charge. But it did, in effect. If that appearance is not corrected, and promptly, F&DA can expect only criticism from the fair-minded leaders of many divisions of industry.

It is not clear how F&DA executives can restore the system of standards-making to the respected position it deserves. But they must try. Further proceedings along the line of sugar controversy, chemical wrangling, and imputation of bad faith on the part of industry must stop.

Furthermore, standards hearings must be curtailed within reason. A definition or a standard of identity must be sufficiently simplified so that it serves the purpose for which originally planned. Otherwise there will be no point in any such standards proceedings.

▪ Dairy Industry Has Problems More Serious Than Margarine

Losing the butter-versus-margarine battle might be the best thing that could happen to the dairy industry. Then it could cease stirring up popular ill-will in this controversy and turn its attention to more serious matters. Two big problems face it: One is to cut the cost of distribution of fluid milk. The other is to tell the public in convincing terms what an excellent service it performs at little profit.

The dairy industry has much to brag about, even if consumers and politicians don't realize it. For example, it is one of the most advanced in respect to processing efficiency and sanitary operation of all the food industries. This is proved beyond any shadow of a doubt by the way other industries are copying its methods and adapting its equipment.

And in spite of popular belief to the contrary, it is well-known in the industry that there is little profit in fluid milk.

So we say it would be a good thing if the dairy industry could turn its attention from margarine to other and more important problems. At least one municipal investigator was able to force a price cut, in fluid milk, by claiming that the dairies were robbing consumers and by discrediting the facts presented by the milk companies and by an independent investigator. With the real facts on their side, milk companies should find ways of effectively getting these facts across to consumers.

Then there's the distribution problem. Recently the high cost of having six separate dairies deliver milk to the same store every day has been questioned. And it is a good question. To answer it is not easy. Competition must be retained. But less frequent delivery merits study. And the possibilities of cooperative distribution systems should be investigated.

We don't claim to know the answers. But the industry had better come up with some. Every now and then a bill to make the dairy industry a public utility is introduced in a state legislature. Don't give the politicians a chance to put such a thing over.

▪ Episode in St. Louis Proves That Plant Sanitation Pays

Several small bread bakeries, and some that are not so small, have been fined for violation of the Federal Food, Drug & Cosmetic Law in St. Louis. The charge was adulteration, but the fault was filth. This episode, occurring in March, 1949, received a thorough airing in the local newspapers, together with photographs. It aroused the local Consumers Federation to the point that a large number of housewives visited bakeries in company with municipal food inspectors. It further resulted in introduction by the Board of Aldermen of a municipal licensing ordinance for commercial bakeries.

Nice business! We don't think that the Secretary of the Associated Retail Bakers helped the situation, either, by wondering aloud how many housewives' kitchens would pass a state inspection.

Cleanliness is attainable if management wants it. Certainly it costs effort and some money! Fines cost money, too. But lost business costs a whole lot more than the cost of cleanliness.

As we have often remarked in these pages, man is not a cleanly animal except when he has been educated to it. Judging by some of the photographs in the St. Louis papers (a two-page spread in one instance) a lot of people need a lot of education.

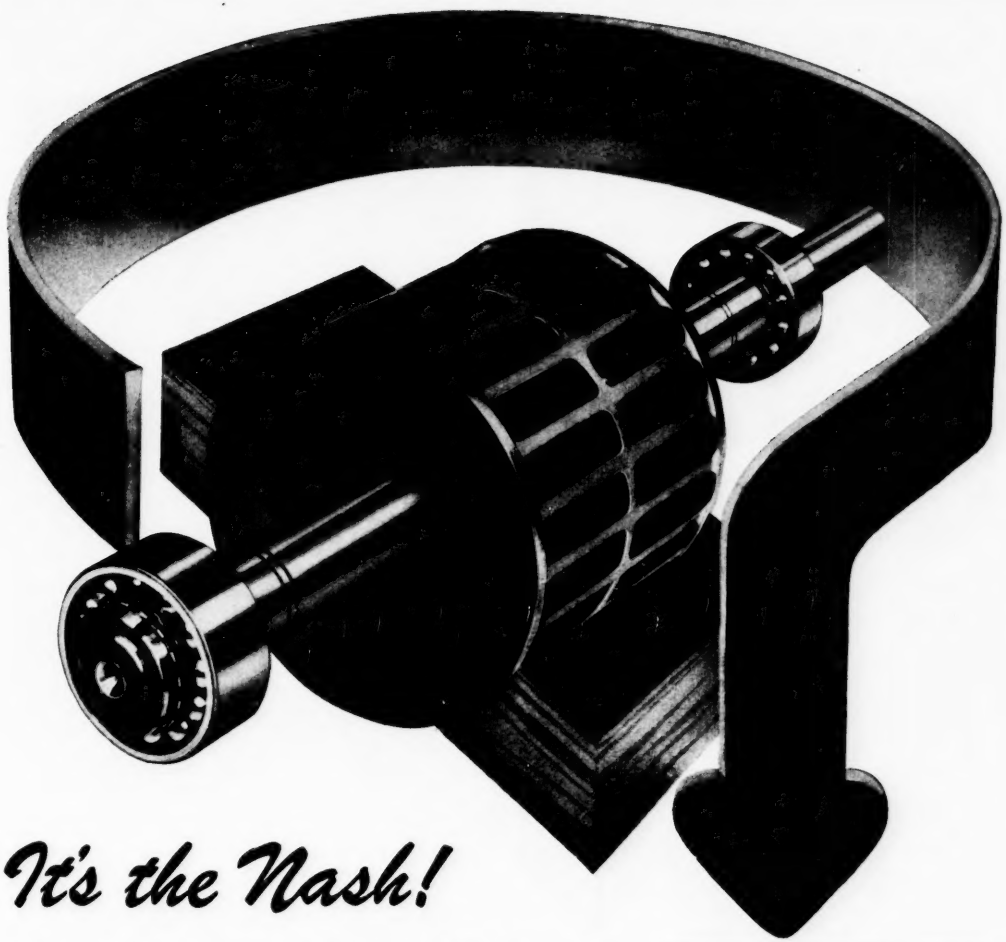
▪ If These Remarks Apply to You, Don't Read Them

In our travels about the food industry, we occasionally bump into individuals who surprise us by their blasé aloofness from what goes. They are smugly content with their knowledge of how to run their factories or their departments. Their ears are plugged and their eyes blinded to new ideas and information about new developments. They would never think of borrowing know-how from another field and applying it to their own operations.

We envy those people, because they must be sublimely happy in their self-sufficiency. There is nothing they don't know about their equipment, their processes, and their raw materials. They can run the plant, fix it when it breaks down, and teach newcomers all the tricks.

Yet we feel sorry for these rugged individuals who don't know the meaning of confusion or frustration. They miss so much. They never have the thrill of exploring foreign areas of technology and engineering, of discovering golden nuggets of new know-how. Certainly they never experience the satisfaction of improving an operation or a process by ingenious application of ideas or technics borrowed from afield. Nor do they even enjoy the inspiration that comes from appreciation of the achievements of others.

Well, stockholders permitting, every man to his own desires. And progress be damned. But our self-sufficient friends should remember that liquid assets have a way of drying up behind such a damn.



It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

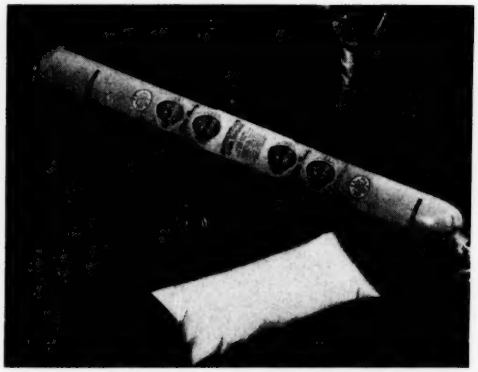
Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY

31 WILSON, SO. NORWALK, CONN.



TRANSPARENT plastic films—particularly Saran (left) and polyethlyene—attracted wide attention at the show.

Packaging Takes the Spotlight

AMA's convention and exposition centers attention on new packaging materials and efficient operation

Lower production costs and a greater stimulus to sales in a buyers' market, due to increasing emphasis by management on improved methods of consumer packaging, were given a thorough airing at the American Management Assn. Packaging Conference, held in Atlantic City last month.

Container costs would be lower by the end of the year, than they were in 1948, according to Lee R. Forker, chairman, AMA's container committee. They will continue much higher than prewar, however. With the trend still on the up in labor costs he said the factor to watch, for any possible declines, was the cost of raw materials.

Availability of packaging equipment is also much improved, Mr. Forker said. Most machinery manufacturers are now able to schedule reasonably prompt delivery. Since packaging machinery is often standard only in the basic sense and generally must be adapted to the customer's particular requirements, it is seldom that shipment of packing equipment is less than 90 to 120 days.

Growth of impulse buying through the development of self-service stores is a great boon to food packaging, according to Robert W. Mueller, managing editor, *Progressive Grocer*. A recent check showed a decline in grocery shopping lists and a compensating tendency to use the store itself as a source of suggestion on what to buy.

Packages displayed at eye level sell considerably better than the same packages on lower shelves. But since all packages cannot be at eye level, Mr. Mueller suggests that producers give some attention to the appearance of their packages when they are displayed 3 or 4 feet below eye level.

Blank spaces for price imprint proved important in tests, which showed sales gains up to 200 percent when prices were marked on package and the space should be large enough to indicate "2 for" and "3 for" prices. in one test, a 14c. package was changed to 2 for 29—and sales went up 84 percent!

In discussing infestation-proof food packages, L. V. Burton, executive director, Packaging Institute, cited the foil-tight wrapped packages used by California Prune & Apricot Growers Assn. These packages are not represented as being infestation-proof, yet they do a satisfactory job, because the package is flavor-tight. This, insects are not attracted to the package, even though they could chew their way through if they were aware of the contents. Dr. Burton saw no reason why this flavor-tightness could not be used as an approach to many troublesome insect infestation problems in the food field.

Expendable paper pallets were shown, by David M. Daly, traffic manager, Bristol-Myers Co., to save over 90 percent of the deadweight costs of wooden pallet shipments, and 10c. per cwt. advantage over unpalletized shipments

Some packaging films, declared Walter Farrelly, packaging supervisor, Cellophane Div., E. I. du Pont de Nemours & Co., depend for their strength and flexibility on moisture absorbed within the sheet. Most of these reach ideal moisture equilibrium at temperatures of 60 to 70 deg. and relative humidity of 40 to 50 percent. Some operations—candy wrapping is an instance—require room conditions that are almost ideal for films. In these cases, the film should be conditioned in this room for at least 24 hours. Other pointers offered by Mr. Farrelly included the following:

At low relative humidities, static will give trouble with all films that are not electrical conductors. A small vaporizer, or even wet cloths hung so as to contact the unwinding roll, will be helpful.

Sticking and excessive dragging in heat sealing of both the coated and the plastic types of films can be minimized by various coatings or coverings on sealing plates. The silicones, the oils, greases and resins have proved effective in many cases. Other materials used to good effect are glass cloth, "teflon" and nylon.

The growing use of positive carry-through for each package on newer machines is eliminating damage caused by stopping the package on the sealing plate. Some manufacturers have equipped their machines with automatic retractors so that the sealing plates cannot remain in contact with the package when the machine is stopped. This saves at least one package with every stoppage of the machine.

Recently, a method for sealing thermoplastic films by means of an electrode stretched over the sealing jaws has been perfected and patented. It shows prom-

use of having wide application for the sealing of the more difficult thermoplastic films.

C. E. Southwich, Jr., technical editor, *Modern Packaging*, advised those interested in better packaging to take immediate steps to learn how to use the versatile polyethylene film and resin. Polyethylene, he pointed out, has outstanding properties, increasing uses, and low costs, therefore, it cannot fail to have a tremendous impact on the future of packaging.

Women want packages that are simple and convenient, reported Marie Sellers, Consumer Services, General Foods Corp., with labels that are legible and not cluttered up with "sell." Of major importance is the size of type and set-up of basic directions.

George Woodruff, head, Machinery Development Div., General Foods Corp., discussed the six stages in the development of new equipment—whether done by users, established machine manufacturer, or special machine designer and builder:

1. Data are collected on labor to be saved, floor space available, machine cost, etc.

2. Ideas are consolidated. At this point, designer or development engineer evolves his concept of what the machine should be like.

3. Basic machine operations are proved, particularly those that are new and unknown. These should be reduced to working models before any machine designing or building is done, to prove the job before too much money is spent.

4. The finished machine is designed and detailed. The design is completed to the last detailed drawing, to get an accurate cost estimate and to provide for economical manufacture of parts in the fabrication shop.

5. The machine is fabricated, assembled, and shop-tested.

6. The machine is installed and a follow-up is made on the performance of the machine in production.

Four factors were brought out by Ned Drucker, managing of engineering, Schenley Distilleries, Inc., in the purchase of packaging equipment by his company: (1) Ability to do the job well—quality of production; (2) maximum operating speed; (3) flexibility, or ability to change from one package to another rapidly and with minimum attachments; and (4) ease in maintenance.

Concurrent with the conference, new uses for packaging materials and equipment were displayed at AMA's Exposition.

The new Saran film 517 10-oz. size liver sausage package, developed by Oscar Mayer Co., plays a dual role of casing and packaging material.

Another innovation, shown by Bakelite Corp., was a milk container developed by Sealright Co., Inc. This container is made by using tasteless, odorless, and non-toxic Vinylite resins to coat rolls of paper, from which containers are die-cut in the flat.

A customer-convenience item, featured by the Cellophane Div. of E. I. du Pont de Nemours & Co., was the "Do-Nuts 'N Coffee" package, automatically wrapped in cellophane with an opening tape.

Goodyear Tire & Rubber Co. displayed oranges, apples, and potatoes put up in 5-lb. pliofilm bags.

Package-users will find many applications for new packaging equipment displayed at the Exposition.

Victory Container Corp., New Hyde Park, N. Y., exhibited its new snap-it corrugated container, which can be manufactured to fold flat in production and can be snapped open, ready for use, in a single movement. Setting-up time is cut to about 2 sec., and 8 to 10 man-hours of labor are estimated to be saved with each 1,000 containers used.

A new self-powered automatic photoelectric code-dating perforator was introduced by The American Perforator Co., Chicago. It handles up to 150 packages with heat seal, wrapping and packaging machines of all types. The unit requires no attachments, and it is movable from one line to another. Its timing is controlled by photoelectric eye. Code dates are perforated through sealed portions of bag or, edge of carton or wrapper.

Wright Machinery Co., Durham, N. C., displayed an automatic weighing machine for accurate net-weighing of dry products at high speed.

A new high-speed, predetermined electronic counter, the Count-O-Matic, was featured by U. S. Engineering Co., N. Y. C. The machine will count a variety of products to any set quantity up to 350,000 pieces per hour, depending upon the product.

Arkell & Smith, Canajoharie, N. Y., displayed a moisture and acid-proof polyethylene kraft-constructed Plasto-Pak bag; a Sta-Stak multiwall shipping sack that prevents shifting in a car or sliding off trucks or skids; and a Shur-Close valve bag that is quick-sealing and quick-filling.

The Arenco Machine Co., N. Y. C., introduced an automatic flour-packing machine that fills, weighs, closes, and seals bags in one continuous operation, requiring only one operator. It handles packages weighing from 4 to 12 lb., and is interchangeable by means of special parts. Bags used are of the self-opening, square-bottom type.

A versatile wrapping machine was exhibited by Miller Wrapping & Sealing Machine Co., Chicago, for prepackaging of meats and delicatessen items. The sheeting attachment has provisions for mounting seven different size cellophane rolls.

More Fish Promotion Urged by Institute

Continued development of prepackaged frozen fish and shellfish markets was urged upon the fishery industry at the fourth annual convention of the National Fisheries Institute, in Chicago in April.

Properly packaged, frozen fish and shellfish can become a six-day-a-week item instead of an item just for Friday consumption, in the opinion of Harley V. McNamara, president, National Tea Co. But, Mr. McNamara added, the industry must stop depending on "acts of God" and must undertake, through aggressive advertising and promotion, to educate the housewife and her family on the values and wide varieties of the fish products that are available.

Promotion in one form or another was also urged by Patsy D'Agostino, D'Agostino Bros., New York; Carl Dipman, editor, *Progressive Grocer;* and Otto K. Eitel, vice-president, Bismarck Hotel, Chicago. Mr. D'Agostino told the producers that they must work more closely with the retail dealer. Too many dealers, he said, feel that it is difficult to get quality products. A tremendous opportunity awaits the industry, he added, if it will just go out and cash in on the product it has.

Mr. Dipman reported that dealers do not know enough about fish products, particularly fresh fish. More advertising, more cooking information, wider distribution, demonstrations—these are the services that retailers are asking of the industry. Mr. Eitel estimated that fish consumption should be about one-third that of meat. This consumption is attainable, he said, if the industry can establish a new vogue for fish by glamorizing its products, making it fashionable to serve fish specialties, and the like.

Mildly protesting the recent U. S. action in curtailing fish imports, Clive Planta, executive secretary, Fisheries Council of Canada, stated that world markets can take care of the normal maximum production of fish and shellfish. A 5 lb. increase in per capita consumption in both the U. S. and Canada, he said, would absorb all the production we could attain.

Mr. Planta denied the allegation that the Canadian government is heavily subsidizing its fisheries industry, saying that what little financial

assistance the government does offer is available only to fishermen, not to corporations. He warned of the dangers to the U. S. and to the world of policies leading to scarcity production either within the U. S. or by influence on other countries.

Another protest, this one against the Railway Express Agency's efforts to increase, by 25 percent, its icing rates on fresh and frozen fish and shellfish products, was made by E. A. Ruthford, vice-president, San Juan Fishing & Packing Co., Seattle. These express rates, he maintained, should be decreased rather than increased in view of the additional responsibility that fisheries are themselves assuming in transportation. This has been necessary, he said, because of failure of REA to carry out such responsibility.

Retiring President Carlton Crawford noted that 10,000,000 lb. more fresh and frozen fish had been sold during the first quarter of 1949 than in the same 1948 period. He credited wider distribution at low prices.

Harald Synnestvedt, Sr., president, New England Fish Co., Seattle, was named president of the Institute for the coming year. W. Wade Ambrose, Westgate Sea Products Co., San Diego, was elected secretary, and F. M. Bundy, Gloucester, Mass., treasurer. Regional vice-presidents are: Irving Usen, Boston; Sol Fass, Portsmouth, Va.; F. W. Taylor, Pensacola, Fla.; Lionel Shatz, San Francisco; Arnold Waring, Seattle, and William Lippman, Chicago.

Brewers Learn More Yeast Uses

Progress and growth of the nation's brewing industry, together with the need for developing the home market as a method of continuing this growth, were the subjects highlighted at the 73rd annual convention of the United States Brewers Foundation held in New York City last month.

In the words of Edward V. Lahey, chairman and president of the foundation, "The past year was marked by the decisive defeat of prohibition forces in various states, and increased acceptance of beer and ale as beverages in the American home."

Mr. Lahey called attention to the fact that, out of a national total of 1,567 county, city, township and precinct local-option elections, 928 units voted for the legal sale of beer, while 639 voted against it. Of the former, 840 districts voted to retain the legal sale and 88, previously dry, voted for legal sale. On the other hand, 529 prohibition areas voted to remain dry and an additional 110 areas voted out the legal sale of beer.

Brewer's Dried Yeast

Of special interest to other food processors was the report of J. S. McCourtney, president of the Brewers' Yeast Council. "One of the newest commercial uses of brewers' dried yeast" according to Mr. McCourtney "is its introduction into candy, giving the confection an important nutritional supplement without impairing its flavor." This was made possible through research in cooperation with the National Confectioners' Assn. and USDA.

Working with the Food & Container Institute of the Armed Forces, the council has successfully incorporated food grade brewers' yeast into white bread, enriching it to a greater degree than is done by present programs.

"One of the outstanding results of recent research," Mr. McCourtney said, "was a revision of the accepted Connecticut Broiler Ration for poultry by incorporation of brewers' yeast as a replacement for livermeal."

He reported the successful use of yeast as a pollen substitute for bees in cold months, and its employment in the raising of fur-bearing animals, especially mink, where it tends to produce glossier pelts.

"A few years ago," he said, "brewers' yeast represented a waste disposal problem, but today the supply is insufficient to meet demand.

BREWERS FOUNDATION leaders hear Sen. C. M. Anderson at luncheon. From left: F. E. Mason, executive director; R. T. Riney, secretary; A. A. Busch, Jr., 2nd vice-chairman; Senator Anderson; E. V. Lahey, president and chairman; R. G. Jones, 1st vice-chairman; A. J. Bates, treasurer; C. M. Hester.

Increased Consumption Pushed by Millers

Continuation of the millers' long range program during 1950 was unanimously voted by the Millers National Federation of its 47th annual meeting held in Chicago in May. The goal is an increased consumption of foods containing enriched wheat flour. National advertising, educational activities and general publicity are being employed.

The program was initiated during May and June of 1948, and it is being financed by an assessment of 0.8c. per 100 lb. of flour made during 1947. A carryover of $350,000 makes possible a reduction in assessment to 0.6c. per 100 lb. of flour made during 1948, subject to a 75 percent signup. This is payable during 1949.

John Locke of the Fisher Flouring Co., Seattle, who was re-elected president of the federation, reported a reduction of 2½ to 3 billion lb. per year in flour milling capacity during the past year due to fires and mill downs. Approximately 80 percent of the latter is the result of mills going out of business because of adverse economic situations.

Mr. Locke's observation is that even though 1948 flour production was 9 percent below 1947 and profits were negligible, there is no justification for gloom or pessimism. Flour production reached an all-time high in 1947, and 1948 production was the second largest in history. He attributes lack of profits to unwise pricing and lack of application of fundamental business principles to meet rising costs, rather than to excess milling capacity.

The federation's report to its membership covered: (A) Successful fight against brand-pirate legislation, (B) assistance in passage of state flour enrichment laws, (C) study of variations in weight of flour packages due to moisture loss, (D) elimination of flour-bag reuse by millers and bakers, (E) promotion of improved mill sanitation, with emphasis on elimination of insect and rodent infestation, (F) clarification of administrative procedures under the Federal Food, Drug & Cosmetic Act, (G) study and adoption of new flour maturing agents, (H) support of a new course in flour milling at the University of Minnesota and expansion of milling studies at Kansas State College, and (I) activities of the Wheat Four Institute, including use of four series of colored slides as visual teaching aids.

Clarence M. Hardenbergh, president of Commander-Larabee Milling Co., Minneapolis, was voted honorary membership in the Millers National Federation for his many years of technical service to the industry.

Tip-Offs that **Pay Off**

The Blade-of-Grass Test

One of the greatest outfielders in the history of baseball used to throw a blade of grass into the air every time he went to his position. Why? Easy! . . . he was smart. Winds in a ball park are tricky and to test the wind with a blade of grass meant catching balls, winning games, a pennant, the series, and *more dough* . . . a subject dear to a ballplayer's heart.

The Who's-Listening-To-What Test

"How's your Hooper" is the popular greeting with radio entertainers. That is, it's popular if the Hooper is good . . . for the Hooper is a test of a program's popularity determined by thousands of phone calls throughout the day asking people in homes "What program are you listening to?" Naturally, a good Hooper pays off.

The Down-To-Earth Test

Warning! Before you buy that little farm . . . that place to get away from it all . . . be sure to have the soil thoroughly tested. It will save you plenty of headaches.

The How-Many-Feet-in-a-Gallon Test

Here's the tip-off that pays off on paints. When considering paints for the interior of your plant, *forget about the cost per gallon.* It doesn't mean a thing. The real factors to consider are the number of square feet of proper coverage you get per gallon and . . . because labor represents 80% of your total cost . . . *the time involved for painting.*

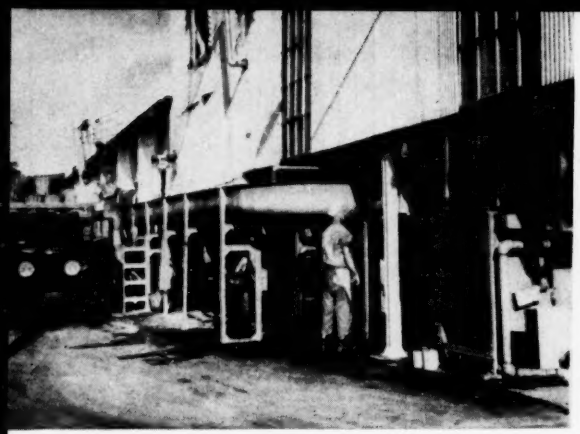
See for yourself. Compare a gallon of any paint you want with a gallon of Barreled Sunlight. Thin them both according to directions. Put them on a wall. Check the number of square feet each covers. Check the length of painting time for each. Note the difference in appearance after drying. You'll be thoroughly convinced that Barreled Sunlight . . . even though it costs more per gallon . . . will give you a better-looking, long-lasting paint job *for less money* than any other paint.

It will pay you to talk with your nearest Barreled Sunlight representative. Write, and he'll call.

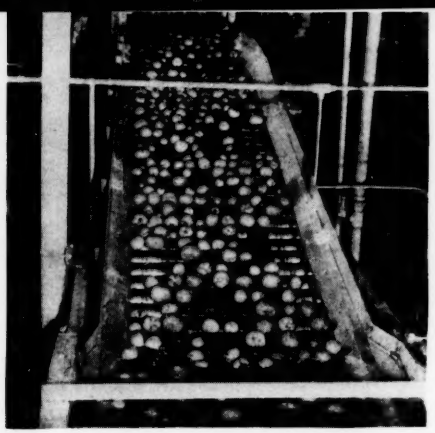
U.S. GUTTA PERCHA PAINT COMPANY
37-F Dudley St., Providence, R. I.

Barreled Sunlight *Paints*

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job



1 **WATER FLUMES** carry the tomatoes to the processing lines. Unloading tomatoes into water minimizes bruising.



2 **ALL** soil on surfaces of tomatoes is loosened by soaking and removed by spray washing.

Tomato Juice and Catsup Processing

Instrument Controlled Equipment Improves Product Quality, Speeds Output

THE START of tomato juice and catsup manufacture at the P. J. Ritter plant, Bridgeton, N. J., is marked by direct delivery of the raw material to the lines. Unloaded right from the farmer's trucks into flume-conveyors—see photo above and Point (1) in the foldout flowsheet, right—the tomatoes are floated to the production lines, which begin at the soaker-washer.

Live-roller conveyors are employed to remove the tomatoes from the soaker-washer. Rotation of the rollers, as the conveyor is moving forward, causes the tomatoes to turn, thereby exposing their entire surfaces to the water sprays for thorough washing. After cleaning, they continue on the same roller conveyor to trimming and inspection.

Inspected tomatoes are then passed through live-steam scalders, which loosen the skins. Metal hoods above the scalders are installed to remove the live steam to the atmosphere, preventing its dispersion through the plant.

Seeds and skins, which are separated from the juice in the pulpers, are transferred by diaphragm pumps to the seed processing department. In this department, the seeds are soaked in agitator-equipped tanks to ferment and loosen the pulp from the seed. The pulp is then decanted and washed from the seeds. Next, the seeds are transferred to temperature-controlled air-blast driers. Dried seeds are then cleaned and sacked.

Juice from the pulpers is pumped to cyclone preheating-holding tanks. These tanks are either glass-lined steel or stainless steel throughout, and are equipped with nickel alloy or copper steam coils as heating elements. Juice lines throughout the process are all-glass pipe, with the exception of the section connecting to the pumps. This link, because of pump vibration, is stainless steel piping. Glass pipe lines permit visual inspection of the juice during the process. Cyclone juice is the base for canned tomato juice, catsup, puree, paste, and pulp.

When canned juice is to be the end-product, cyclone juice is pumped through a finisher enroute to the instrument-controlled, stainless-steel plate-type flash pasteurizer—see Point (7) on the flowsheet.

The incoming juice is initially preheated in the first section of the unit by the pasteurized juice leaving the pasteurizer. Then it is brought to the required temperature in the next section by heated water. Next, it is circulated through the pasteurizing loop and rapidly cooled by the juice entering the system.

Both the temperature and flow rate of the juice through the pasteurizer are instrument controlled and recorded. Variable speed control on the circulating pump motor regulates the flow of juice through the holding tube—instrument-controlled for the required time. Pasteurized juice passes to a surge tank prior to going to the automatic filling machines.

Bottles or cans of juice from the fillers go to cappers or closing machines, and are immediately cooled in fog-spray units. Moist containers leaving the coolers are passed through driers prior to labeling and casing.

When catsup is processed, cyclone juice is run to the evaporators—Point (9) on the flowsheet. Vinegar and sugar sirup are metered into the juice and other ingredients added. The condensed product is sent via sanitary pumps from the evaporators to a holding tank supplying the vacuum deaerator. The latter unit removes entrapped air from the catsup, which then goes direct to the filling machines. The operation of filling, closing, cooling, drying, labeling and casing are continuous.

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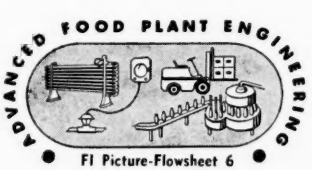
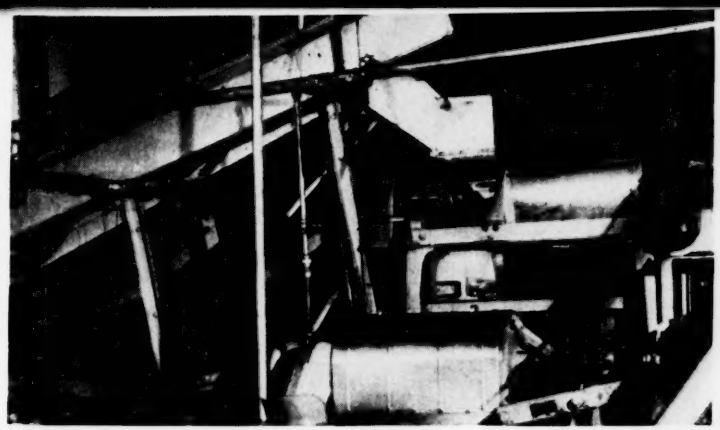
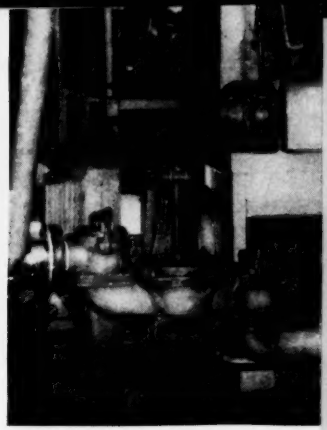
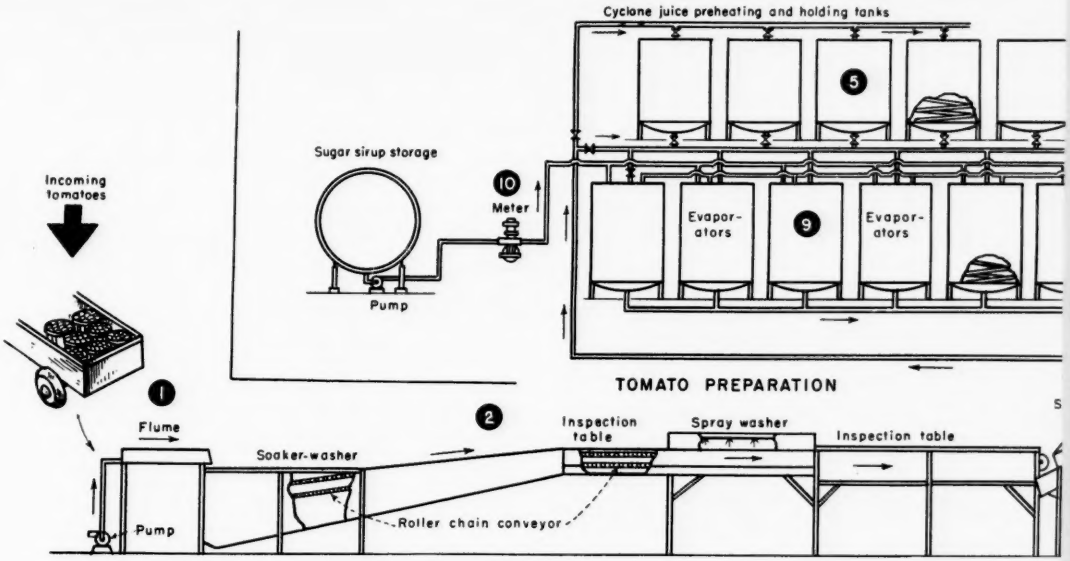




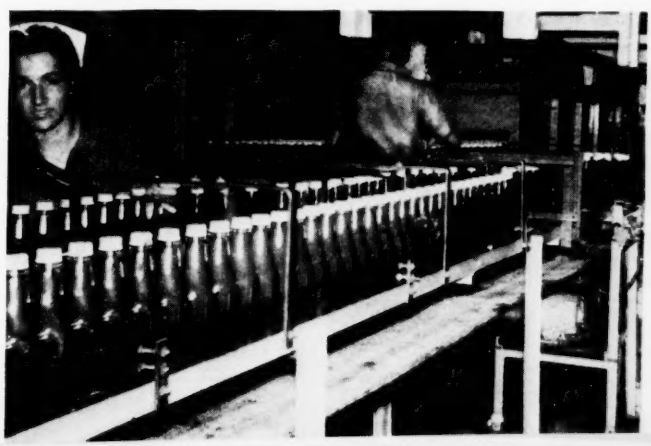
3 **IN SCALDER** (top left) skins of inspected tomatoes are loosened, and then they are separated in pulper installed below. Flow through both units is continuous.



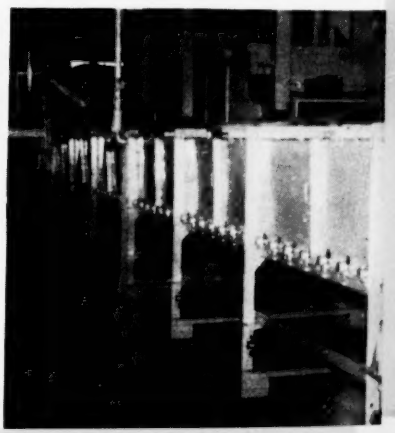
4 **THESE DIAPHRAGM PUMPS** plac skins to the processing departmer

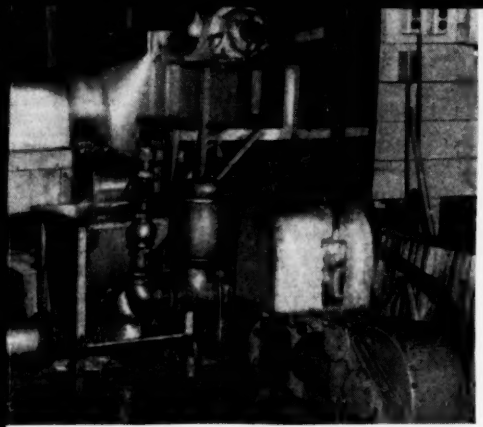


13 **BOTTLES** of catsup move single file on a continuous conveyor from the spray cooler (rear) and are air dried (foreground) on way to labelers.

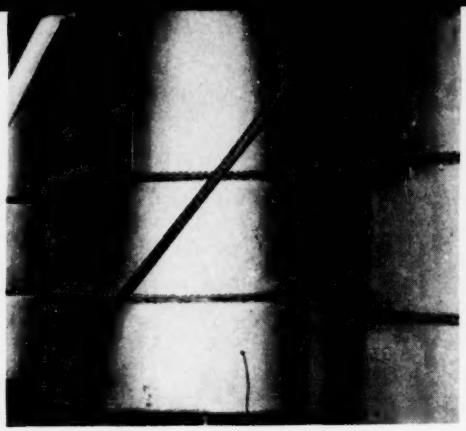


12 **CONTINUOUS** fog-spray units are employe juice, which come directly from the capp



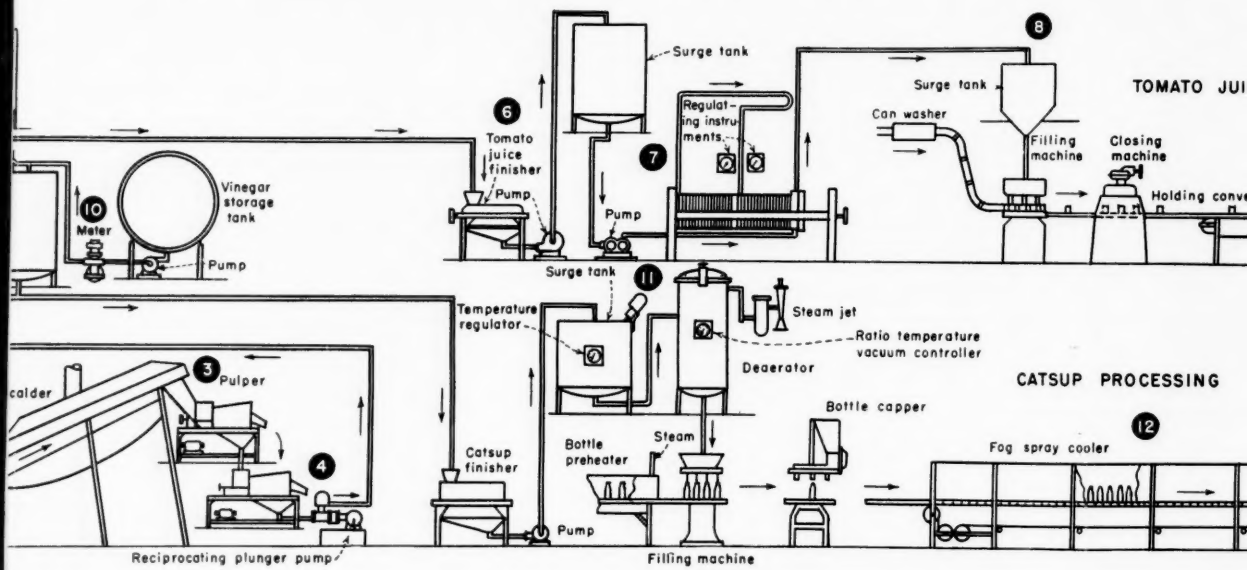


ed below the pulper (left and right) move the seeds and
t where the seeds are recovered.



5 **CYCLONE** preheating-holding tanks are equipped with nickel alloy or copper steam-heating coils.

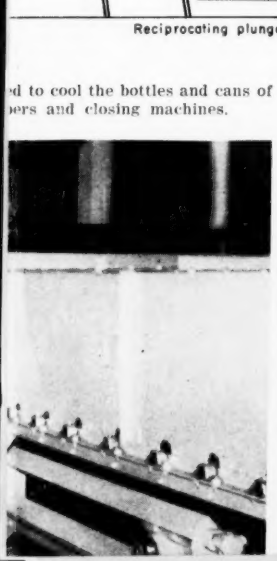
6 **FINE SCREEN** finisher
the cyclone juice prior to

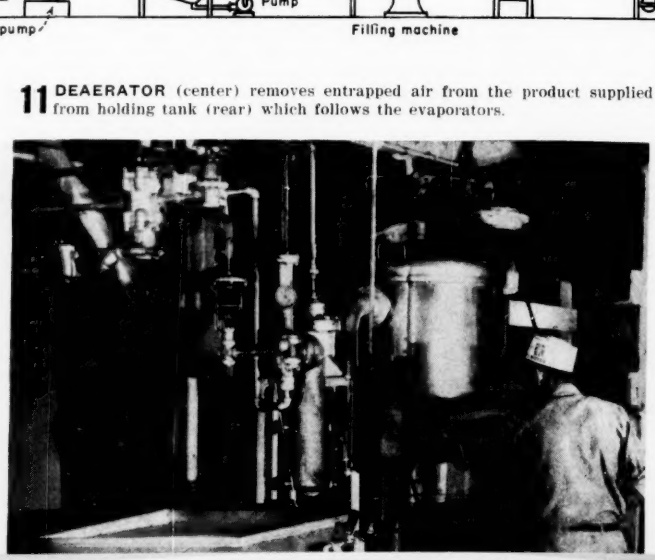


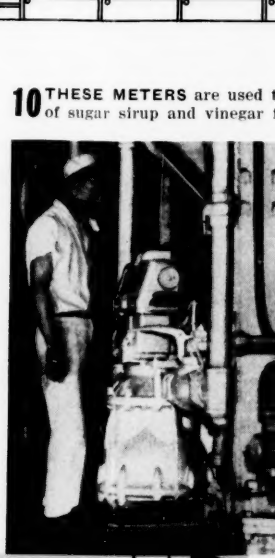
ed to cool the bottles and cans of
ers and closing machines.

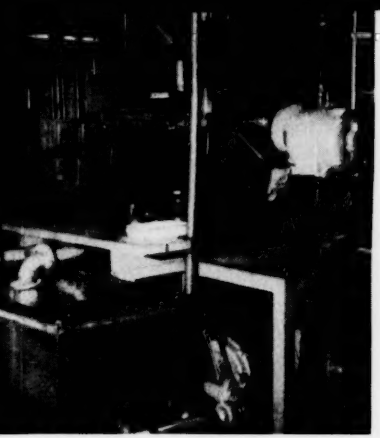
11 **DEAERATOR** (center) removes entrapped air from the product supplied from holding tank (rear) which follows the evaporators.

10 **THESE METERS** are used t
of sugar sirup and vinegar

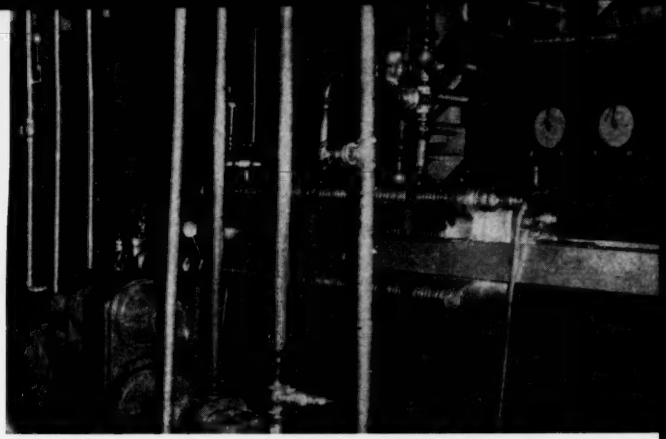






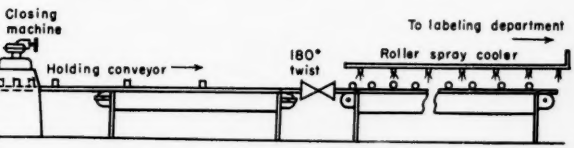


CREEN finisher (top) is employed to clarify
ne juice prior to pasteurization.

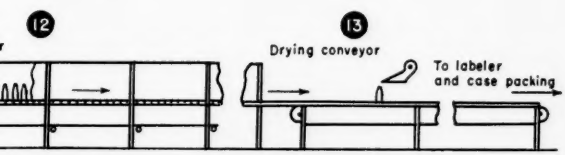


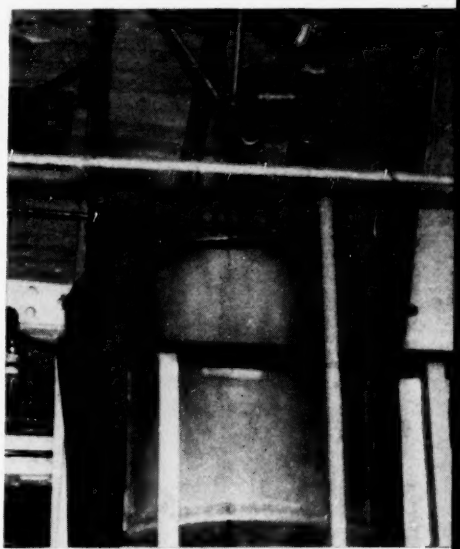
7 INCOMING juice and pasteurized juice leaving this stainless steel plate pasteurizer effect a heat exchange. Operation is instrument controlled.

TOMATO JUICE PROCESSING



PROCESSING

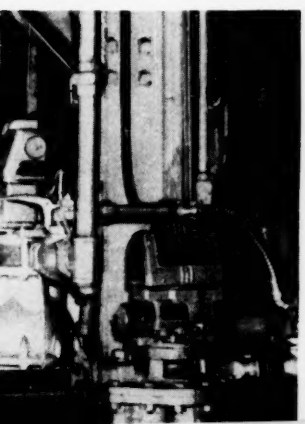


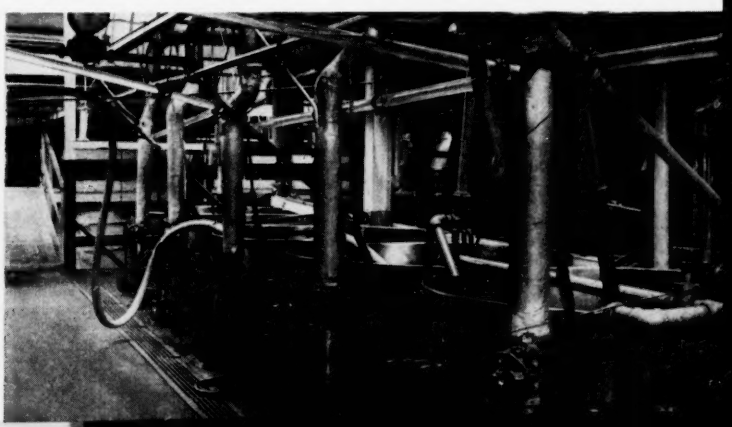


8 CAN AND BOTTLE filling machines are fed from this surge tank on mezzanine floor.

ETERS are used to regulate amounts
rup and vinegar fed into catsup.

9 JUICE from cyclone tanks is evaporated in these open, stainless-steel kettles equipped with steam-heating coils. Glass pipelines are used to carry product.





Artist—William Traher, native of Wyoming

WYOMING—*annual purchases: $255 million—mostly packaged.*

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Now, after com
sents this better
more services
Stemming from
ically new bonne
ment, this origi
outstanding ser

1. LONGER DIA
is used *only* to
purposes.

2. POSITIVE SHU
an exclusive Cra

3. ACCURATE SI
silient seating s

4. GREATER FLO
pressure drop, a

5. EASIER OPERA
construction tak

GET THIS L

See
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**This new Crane li
screwed ends in si
ends from ½ to 4
—flanged ends on**

EVERYTHI

VALVES
FITTINGS
PIPE

outstanding improvement in DIAPHRAGM VALVES by CRANE

NEW SEATING ARRANGEMENT MORE DURABLE... SAFER... MORE EFFICIENT

Now, after completing exhaustive tests, Crane presents this better diaphragm valve—better suited for more services under today's working conditions. Stemming from basic improvements, such as the radically new bonnet-sealing and valve-seating arrangement, this original Crane design introduces many outstanding service features like those shown here.

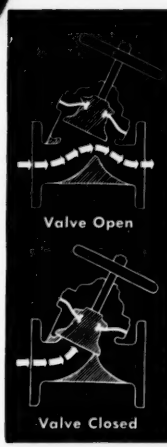
1. LONGER DIAPHRAGM LIFE, because diaphragm is used *only* to seal the bonnet—not for seating purposes.

2. POSITIVE SHUT-OFF in case of diaphragm failure. This is an exclusive Crane safety feature.

3. ACCURATE SEATING—new flat face disc with durable, resilient seating surface assures tight closure on all fluids.

4. GREATER FLOW CAPACITY with reduced resistance and pressure drop, assured by Crane Y-pattern body design.

5. EASIER OPERATION—Crane separate disc and diaphragm construction takes less torque—fewer turns—to operate.



HOW IT WORKS

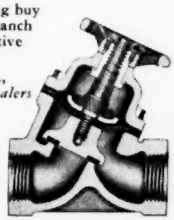
The Crane diaphragm serves one function only—sealing the bonnet. It is not subject to crushing and rapid wear. The seating member is a separate circular flat face disc, firmly attached to the stem and joined to the diaphragm with a special leakproof connection. This independent seating feature permits positive shut-off with no loss of fluid, even in case of diaphragm failure.

GET THIS DESCRIPTIVE CATALOG

See these new valves—the outstanding buy in their class—at your local Crane Branch or Wholesaler. Or write for descriptive catalog AD-1761.

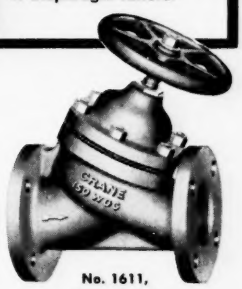
CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

This new Crane line includes iron valves with screwed ends in sizes ½ to 2 in.; with flanged ends from ½ to 4 in. Neoprene coated valves—flanged ends only—in sizes from ½ to 4 in.



No. 1610, screwed ends

No. 1615, flanged ends, neoprene coated



No. 1611, flanged ends

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ALVANYA's flavor strength is 40 times that of true vanilla.

ALVANYA will improve any vanilla flavor, true or imitation, and it is remarkably effective when added to the exhaustively extracted "pure" vanillas with which the market is currently flooded.

ALVANYA will provide an outstanding flavor when used to replace true vanilla in a vanilla-vanillin mixture and will contribute a vast flavor improvement when used to replace all or part of the vanillin constituent.

ALVANYA has superior stability under extreme temperatures, both low and high.

ALVANYA costs only $1.90 lb., in 25 lb. lots, or more.

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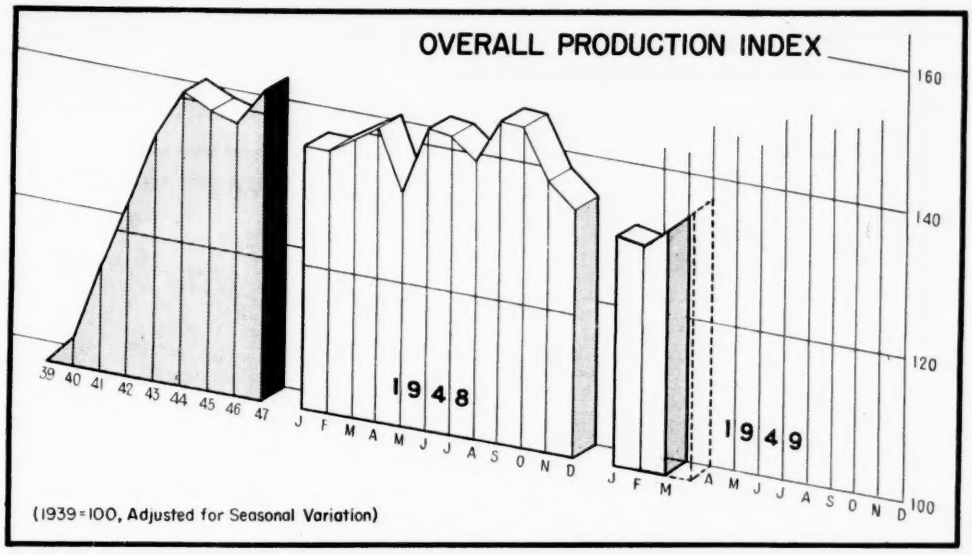
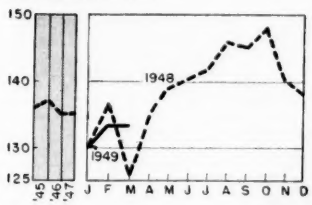
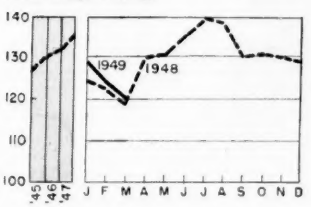
Food Industries Index


OVERALL PRODUCTION INDEX
160
140
120
100
39 40 41 42 43 44 45 46 47
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Baking Stays Level



Flour Keeps Falling



At a Glance—

(1939 = 100, With All Figures Adjusted for Seasonal Variations)

	Mar. 1949	Feb. 1949	Percent Change	Year Ago
Baking	134	134	..	127
Beverages	151	149	+1	148
Butter	77	75	+3	62
Canning	140	133	+5	150
Cereals	141	141	..	123
Condensed Milk	171	169	+1	166
Confectionery	113	116	−3	133
Flour	120	124	−3	116
Ice Cream	162	168	−4	166
Malt Liquors	152	142	+7	162
Margarine	265	272	−3	235
Meat Packing	140	133	+5	146
Sugar, Beet	65	71	−8	96
Sugar, Cane	67	69	−3	80

Another 3-Point Rise In Food Output Bears Out Anticipated Upswing

INCREASED food production for the second consecutive month is reflected in the preliminary April figure of our index. Rising to 137 from the final March figure of 134, it reverses a downtrend that developed during the fall. It now seems likely that total food production will show a more than seasonal rise for the second quarter of this year, with output not far below the 1948 level.

Meat and dairy production are expected to show notable gains. In March, meat packing activity was 5 percent above February. And April figures should show a continued increase. March butter output was 3 percent higher than in February. In general, the better supply of feed grains has resulted in heavier output of livestock products.

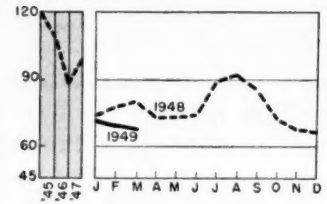
Production of flour and baked goods held fairly steady in recent months. But both industries have dropped off considerably from their peak rates. In the case of flour, this drop is partly caused by a decline in exports. But output of both flour and baked goods also has been affected by trends in the domestic market.

United States consumption of flour and bread has remained fairly constant over short periods, although there has been, for many years, a gradual trend toward lower per capita consumption of these products. Here, changes in retail price and consumer incomes do not affect demand as strongly as in the case of meats or dairy products. This is particularly true of bread because it is a staple in most diets.

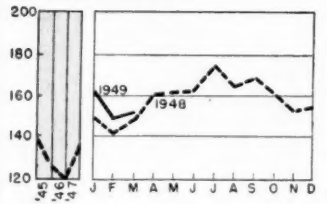
However, high prices may have affected the overall demand for baked goods in 1949. Flour and baked goods prices are scarcely below their all-time peaks, whereas prices of most other foods have declined sharply this year. This could weaken demand for fancier bakery products, such as cakes and cookies, and perhaps even for bread. Baking totals have also been shaved this year by a strike that closed down some of the large New York bakeries.

Plant capacity in the milling and baking industries has not been much increased since before the war. Meanwhile, population has risen considerably. As a result, existing plants have at times run close to capacity. It seems logical, therefore, to expect some additional plant construction. And new equipment, such as band

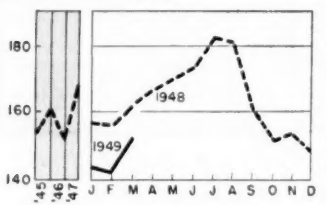
Cane Sugar Still Falls



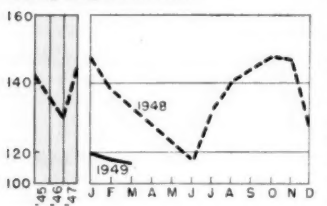
Beverages Bounce Back



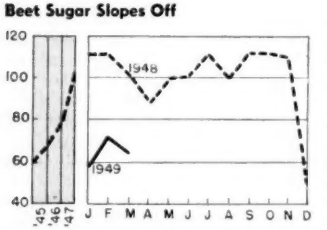
Malt Drinks Turn Up



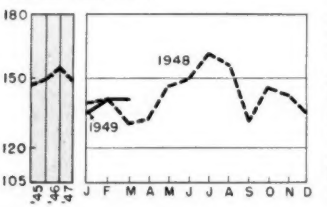
Candy Drops Some More



Beet Sugar Slopes Off



Cereals Hold Level



ovens, should permit greater output from existing facilities.

Eventually, too, the drop that has taken place in wheat prices should permit cheaper flour and bread, with some resulting stimulus to consumer purchases. So the long term outlook is for greater production of flour and baked goods.

The rise in total food production, which has marked the spring months, is encouraging. Food processing is one of the few consumer industries to show such a rise. One reason is the continued improvement in the flow of livestock products, which was subnormal during 1948. Another is the ready movement of food products in retail outlets. Retail food store sales in the first quarter topped last year, although prices were lower, and the trend has evidently continued in the second quarter. Higher sales at lower prices indicate a real improvement in health of the market. Distributors evidently have found it necessary to draw on increased shipments from food manufacturers in order to meet this demand.

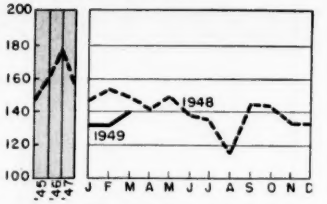
Big question now is whether consumer demand will continue so strong. Demand for many foods, particularly meat and dairy products, has been sustained by a very high level of consumer income. And this in turn depends on the high level of employment that has prevailed ever since the war. Employment has shown a seasonal pick-up this spring, but the improvement has been less than last year. And there are real questions about the outlook for summer and fall.

Most disturbing is the possibility of major strikes in heavy industry. Many labor contracts are coming up for reopening, with neither side in a mood to give in. Strikes would cut heavily into the national total of wage payments and into the working family's food budget. Layoffs are also taking place in many industries that have worked off the peak of their postwar demand.

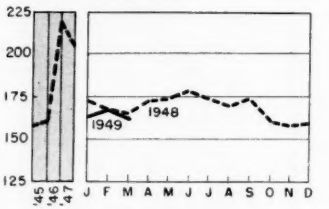
The real question mark comes in the capital goods industries, which employ a third of our industrial workers. Activity in the steel industry has been edging downward. Demand has also slackened in some types of construction and machinery.

Food distributors have consistently followed a cautious inventory policy for the past year. The orders they place with manufacturers depend very largely on the extent of consumer purchases. Distributors have hesitated to risk carrying much stock when the outlook is uncertain. So a continued uptrend in food processing for the coming months depends on continued high employment and consumer spending.

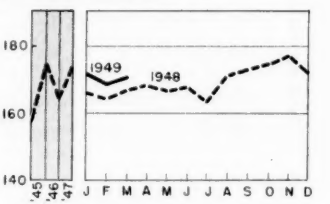
Canning Takes a Jump



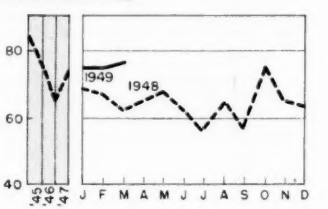
Ice Cream Slides a Bit



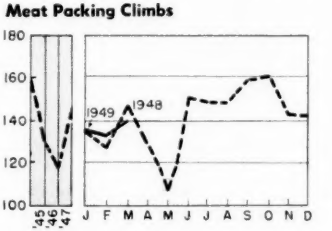
Condensed Milk Rises



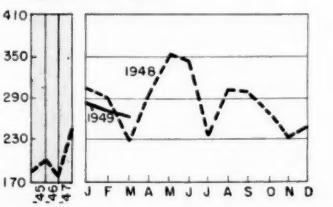
Butter Moves Up



Meat Packing Climbs



Margarine Still Down



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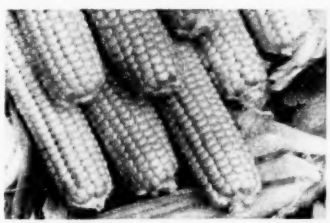

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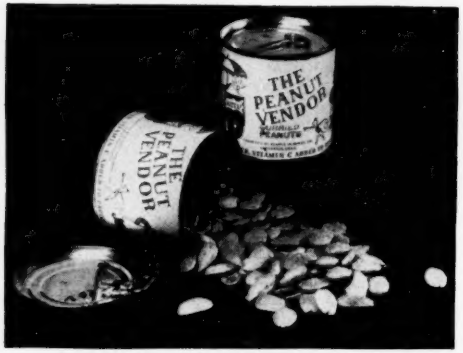


Nuts Now Flavored With Garlic and Curry

With the introduction of garlic flavored roasted almonds and also curried peanuts, The Peanut Vendor, Inc., of Greenwich, Conn., has come up with two outstanding bids for the title of taste sensation of the year.

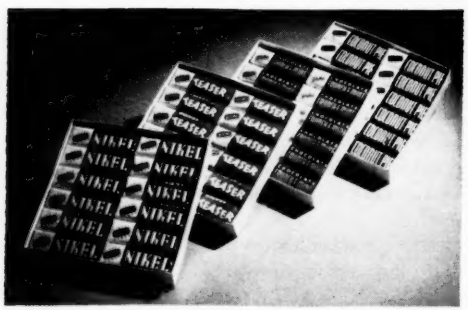
Both products are cooked in peanut oil and vacuum packed with Vitamin C added to protect freshness. They are recommended as a special gourmet's fancy to whet the appetite at cocktail time.

The almonds are toasted, buttered, flavored with garlic and then dusted with cayenne and paprika. The peanuts go through the same process (skipping the garlic) and are powdered with curry.

Each of the two cans has a net weight of 7 oz., and both are gaily decorated with green and fuchsia printing against a white background. The design of the peanut vendor and his trained monkey—the firm's trademark—is a posterized version of the company letterhead.

The firm is now entering the second year of its business, which was developed by Mrs. M. B. Morrow, company president, on the idea of creating a new taste in salted nuts.

Distribution is presently handled in the New York, Southwest, and West Coast areas.



Candy Labels In Distinctive Colors

Complete revision of all printed wrappers was part of a new packaging program for the George Ziegler Candy Co., Milwaukee.

The theme of the new plan features use of a modernized rectangular Ziegler "seal" in the new designs for eight lines of candy bars, and for the 24-bar cartons, general purpose bulk cartons, and three sizes of packaged boxes for the premium "Betty Jane" line.

Discarding the firm's old orange and blue design with black lettering, Brooks Stevens Associates of Milwaukee aimed the revamping at display effectiveness. The new wrappers are styled to be both individually pleasing to the eye and distinctive in mass displays.

Similarity of the various boxed candy bars, readily identified by vertical stripings formed by adjoining wrappers, gives visual "sell appeal" to the related brands.

The "Nikel" wrap is white on bright blue and the "K" is of an original characteristic medallion design. "Teaser" is dominated by a sharp Chinese red with white lettering and layout contrasts. The "Crunch-E-Mint" wrapper has a quick-recognition color combination of mint green, chocolate and white. The letters run in close proximity to lend a tasteful "chewy" appearance. "Coconut Pie" uses a brown and white wrapper to simulate the contrast of coconut and chocolate.

Luxury Soups In Single Portions

Individual servings of fancy "luxury" soups, have been recently introduced by the Heublein Food Importing Co., Inc., New York, N. Y.

Packed in 7½ oz. tins and wrapped in light green and white labels, the new products were recently placed in leading food and department stores in metropolitan New York. Within a few weeks, without benefit of advertising, the sales spread to Texas, Colorado, California and even Honolulu.

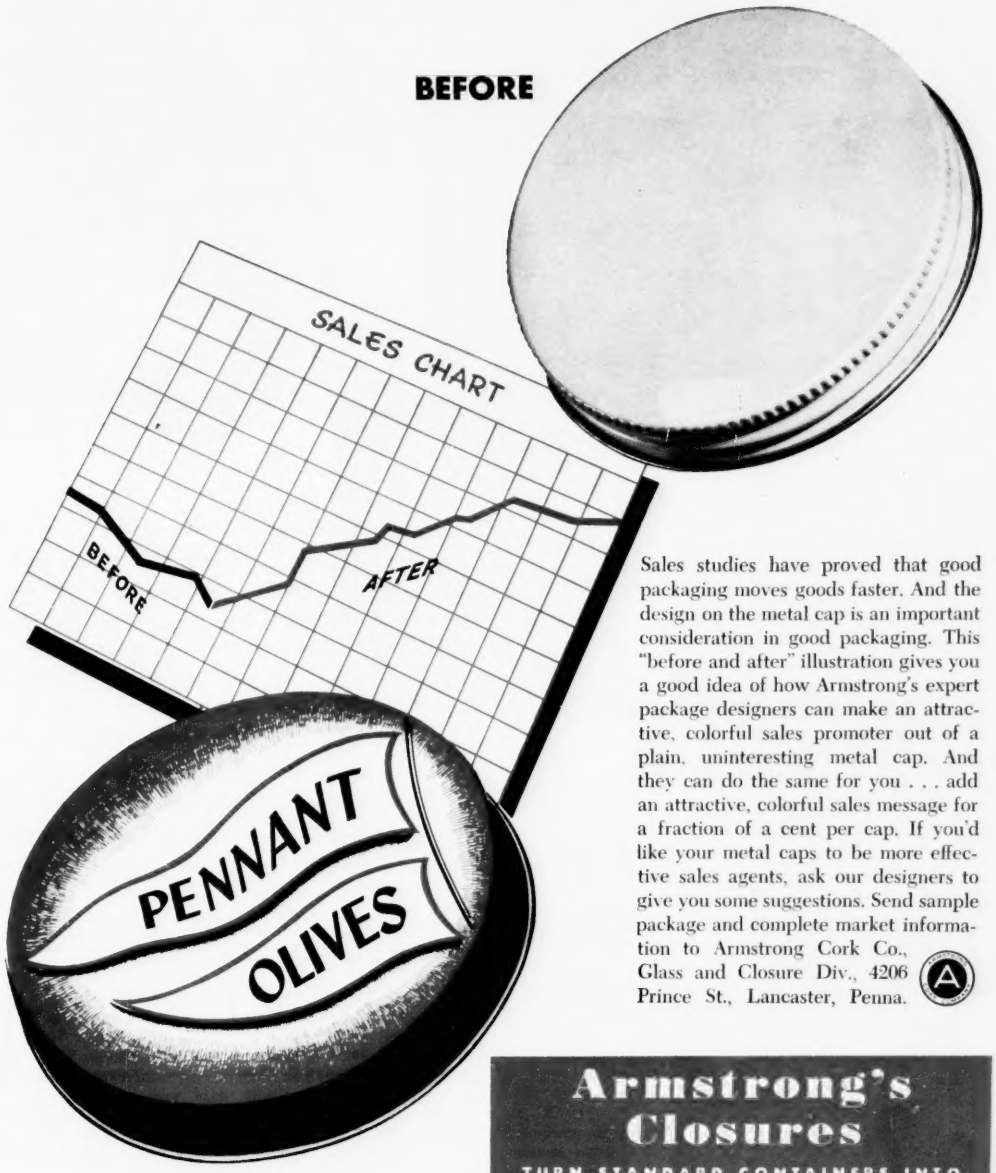
Originally, this one-portion line was planned for high class restaurant and hotel distribution. However, when exhibited at the hotel show last winter, women sampled the soups and indicated that there was an excellent market right in the home kitchen. So the company took the ladies' advice.

Eight different kinds are now offered: Creamed vichyssoise; jellied consomme; onion a la Bretonne (flavored with tomato); onion with turtle meat, chablis and sherry wines; and cream of mushroom, black bean soup, lobster bisque, clear green turtle soup, each of the latter group being flavored with imported sherry.

(Packages and Products Cont'd)

WHICH CAP HAS MORE SALES APPEAL?

BEFORE



AFTER

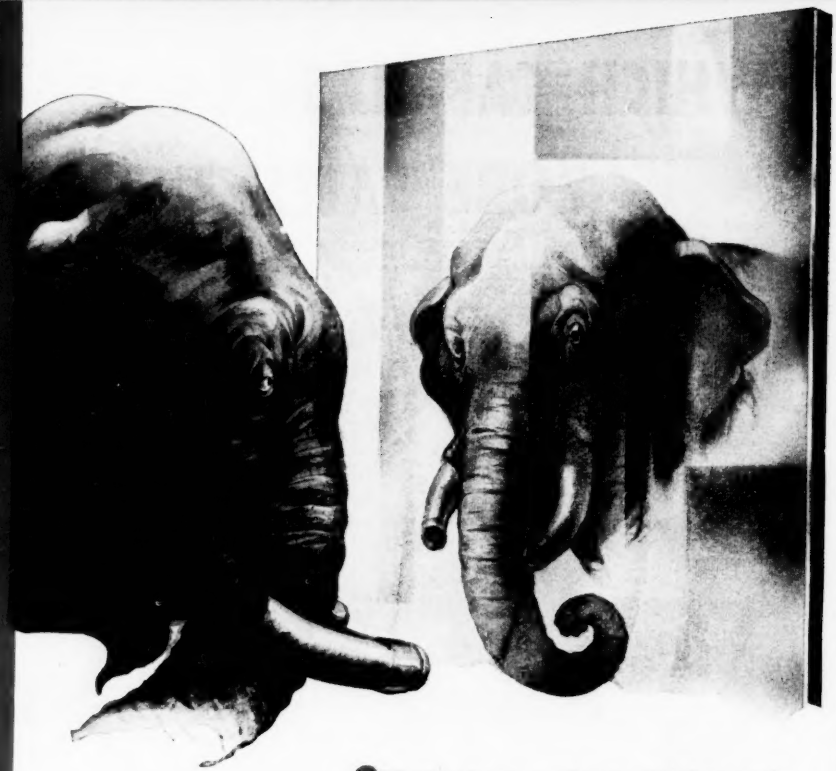
Sales studies have proved that good packaging moves goods faster. And the design on the metal cap is an important consideration in good packaging. This "before and after" illustration gives you a good idea of how Armstrong's expert package designers can make an attractive, colorful sales promoter out of a plain, uninteresting metal cap. And they can do the same for you . . . add an attractive, colorful sales message for a fraction of a cent per cap. If you'd like your metal caps to be more effective sales agents, ask our designers to give you some suggestions. Send sample package and complete market information to Armstrong Cork Co., Glass and Closure Div., 4206 Prince St., Lancaster, Penna.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12.

How thick should an elephant's hide be?



Thick enough to withstand the attacks of its enemies

That's also true of your stainless equipment . . . Why pay for more stainless metal than you need? . . . By using IngAclad you greatly reduce the material cost, yet have perfect stainless protection on the exposed surface . . . IngAclad consists of a 20% cladding of finest stainless steel bonded by the Ingersoll Process to a backing of carbon steel.

If you are considering modernizing your plant with stainless equipment, be sure to investigate IngAclad . . . the only Stainless-Clad material with a 16-year record of satisfactory service in continuous use.

Write for Special IngAclad Folder and Manual of Fabricating and Welding Procedure.

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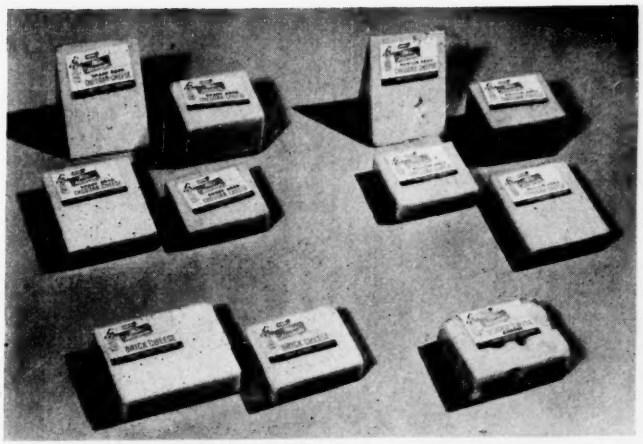


Pre-Packaged Natural Cheese

Under a Miss Wisconsin Label, a full line of medium and sharp aged cheddar (white or colored) cheese, mellow-aged brick, and sliced Swiss cheese is being pre-packaged by Armour and Company, Chicago.

The cheddar comes in 6½ and 9½ oz. rectangles, 9½ oz. wedges, and 13 oz. cubes. Brick is in 6½ and 9½ oz. rectangles, while the sliced Swiss is in a 7 oz. package. In a sales research program conducted throughout the country, these shapes and sizes were determined to be the most attractive to the housewives.

This assortment of sizes of natural cheese has many advantages for the retailer. There is no waste and no drying out of the product. It is rind-free and hence completely edible. There is no need for the retailer to spend time and labor in individual packaging operations. Moreover, inventories can be closely controlled and profits more exactly determined.

Coffee-Aroma Compound

One of the essential constituents of the aroma of roasted coffee—a-furfuryl mercaptan—is now commercially available for the first time.

Produced synthetically, the new Coffee-Captan compound is water white in color; has a specific gravity of 1.132 at 20 deg. C.; boils at 55-57 deg. C. at 17 mm.; is completely miscible with most organic liquids; will not discolor nor polymerize nor oxidize on standing; has a very high dilution factor. It can be diluted with solvents and fixatives.

The product is being made by Cargille Scientific, Inc., New York City. Samples for research purposes are available in 10, 25, 50, 100, 500 and 1000g. containers. Larger quantities will be made available as needed.

In addition to its many uses in the food field for enriching flavors and aromas, it should also be useful as an intermediate in organic synthesis.

Chips From the Tropics

Fried banana chips are being produced by Chip Teez International, Inc., Miami, Fla. The food is made from ripe plantation bananas, sliced thin and fried in vegetable oil to a golden crispness.

To retain freshness, the product is packaged in a duplex bag of moisture-proof cellophane. Shellmar Products Corp., Mount Vernon, Ohio, supplies the bags.

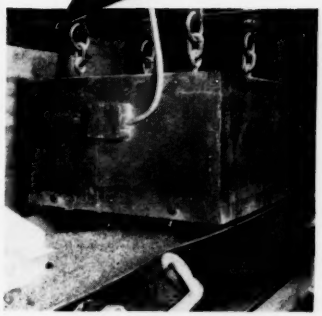
New Soy Flours

Production of two new types of soy flour has been announced by A. E. Staley Mfg. Co., Decatur, Ill.

In the manufacturing process, all of the natural soy oil is removed, refined, and then blended, in the proper amounts, back into the flour as a fine

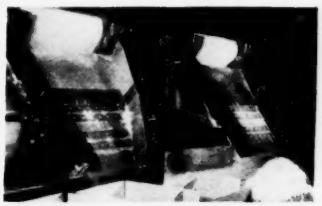
(Packages and Products Cont'd)

How to eliminate lawsuits magnetically



There is no magnetic separator more powerful than the big Dings Triple Pole Rectangular Magnet illustrated above. Ask for Bulletin 301-A.

A noodle manufacturer protects his customers with the *guaranteed-for-life* Dings Alnico Perma-Plates below—and saves $80.00 a week labor to boot! Bulletin B-1205A.



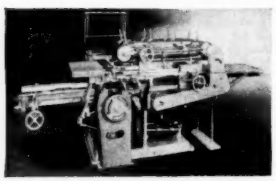
TACKS are tough on teeth! Policemen's stars aren't so good for a valuable milk cow's digestive tract. These two actual cases ended up in court with the plaintiffs seeking damages from the food processor and the feed dealer. If you are in a business where tramp iron can hurt your customers, a powerful Dings Magnetic Separator is better than a lawyer! Wherever magnetic separation can serve, you can depend on:

DINGS MAGNETIC SEPARATOR COMPANY
4712 W. Electric Ave., Milwaukee 14, Wis.

Dings Certified MAGNETIC STRENGTH

I'll take some of these, too, – THEY LOOK SO GOOD!

It will sell on sight if the wrap is right!



Most widely used wrapping machine in the packaged goods field.

Today, unplanned purchases—"impulse sales"—account for an ever-increasing portion of retail sales. Manufacturers, aware of this, are constantly planning more attractive methods of packaging their products. And in a great number of cases these improvements are made practical by "PACKAGE" machines.

During the past few years our engineers have designed machines which wrap a host of products formerly sold in bulk—fruits, produce, textiles, meats, provisions, delicatessen items, etc. And they are continually improving existing models to provide more attractive wrapping at lower costs.

Most of our machines are quickly adjustable for many package sizes, are adaptable to virtually any type of wrapping material.

When you have a wrapping problem, PUT IT UP TO PACKAGE. Consult our nearest office.

Write for a copy of "Packages that Sell"

Some of the many products wrapped on "PACKAGE" machines

PACKAGE MACHINERY COMPANY

SPRINGFIELD 7, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

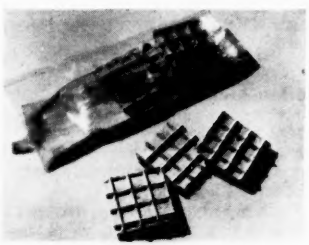
spray. Therefore, as a result, the soy oil is free to mix readily with other ingredients.

The new flours are being packed in 100-lb. sanitary five-ply heavy paper bags. The Powdered Soya-Lo-Fat has about 4 percent soy oil while the Powdered Soya-Hi-Fat contains 14 percent. Both products are specially designed for commercial baking.

Sea Squab Fillets

Recently introduced in the New York City market are canned fillets of sea squab, processed by the Montell Co., Inc., Cambridge, Md.

Reportedly, this is the first time that the swell fish has been boned and processed in the ready-to-use form. The can holds 4¾ oz. of the solid white meat, which has a rich flavor resembling that of crab or tuna. It is recommended to be served either hot or cold. Suggested preparations: Broiled, au gratin, in salads, in canapes, and for sandwiches.

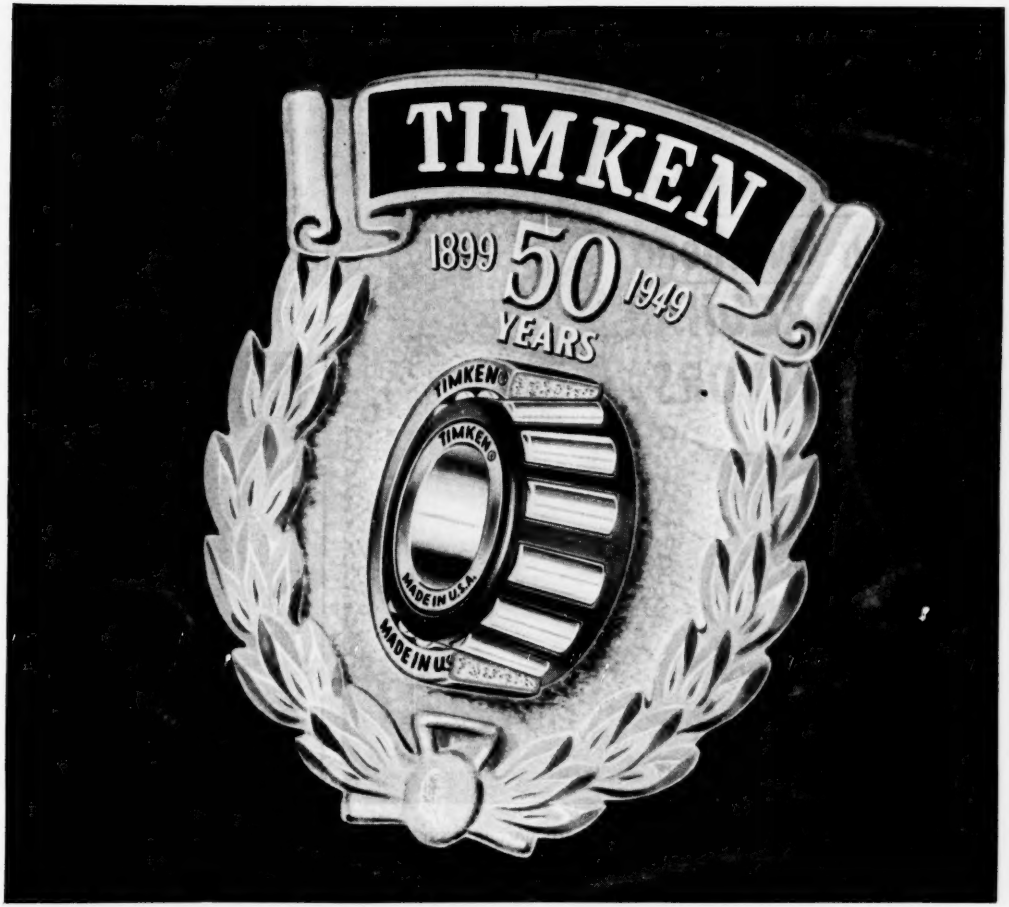


"Pick-U-Up" Coffee Snacks

Specially processed coffee flour is the basis for the novel wafers, Coffee Crisps, now being produced by the Brownmill Laboratories, Inc., Brooklyn, N. Y.

The snacks are suggested for use in the same manner as pretzels or potato chips or in preparing canapes. But in

(Packages and Products Cont'd)



50th birthday of the company whose products you know by the trade-mark: TIMKEN

SINCE 1899 THE TIMKEN ROLLER BEARING COMPANY HAS BEEN HELPING AMERICAN INDUSTRY GET THE MOST FOR ITS MONEY

NOBODY likes to buy a "pig in a poke". In America you don't have to. You're protected by trade-marks like "TIMKEN".

Registered as a trade-mark in the United States Patent Office, "TIMKEN" identifies products made by The Timken Roller Bearing Company: Timken tapered roller bearings, Timken alloy steels and seamless tubing and Timken removable rock bits.

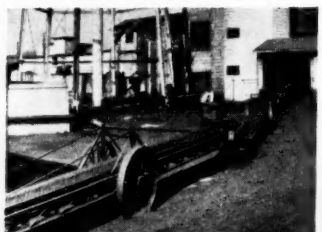
Experience over the years has shown Timken products to be the finest in their respective fields. And many thousands of men and women are working hard to keep them that way. No wonder it has become a habit throughout industry to look for the trade-mark "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

SLASH Handling Costs, Slash Overhead with FARQUHAR CONVEYORS

YOU can slash *maintenance* handling costs *as well as* materials handling expense on your *production line* with Farquhar Conveyors. Whether its *moving* packaged goods, bags, bales, boxes, cartons, or maintenance *handling* of coal, ashes, refuse or raw materials, Farquhar Conveyors will do it *faster, better, cheaper!*

Yes, with Farquhar on the job, you'll load, stack, pile, store or move materials from floor to floor at far less cost . . . cut *all* your materials handling expense to the bone. Farquhar Conveyors are available in various sizes and mounting styles to meet your requirements.

See Farquhar *first* for the right materials handling conveyor for your job. Tell us your handling problem . . . we'll see that you get the information you need! Write: A. B. Farquhar Co., 205 Duke Street, York, Penna., or 628 W. Elm Street, Chicago 10, Ill.



Leading Eastern paper mill uses this complete Farquhar Conveyor line-up to speed coal from railroad cars to pulverizing plant . . . saves $25,000 annual trucking costs!

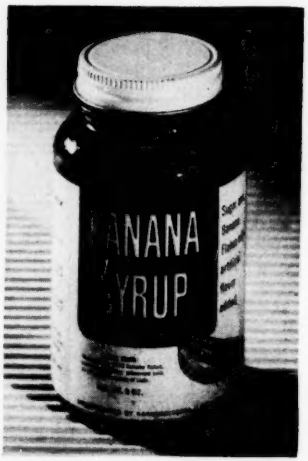
Farquhar
PORTABLE OR PERMANENT MATERIALS HANDLING
CONVEYORS

HYDRAULIC PRESSES · FARM EQUIPMENT · FOOD PROCESSING AND SPECIAL MACHINERY

addition, they are also recommended as beneficial in the treatment of "hangovers". They are low in calorie content, high in protein, and contain the rich coffee ingredients which are helpful in soothing upset stomachs.

Baked to a crisp brown, the wafers are extremely light in weight. More than 360 of the 1½-in. squares are required to make a pound.

The product is packaged 16 to a cellophane bag having a net weight of about 1 oz. Distribution is presently limited to New York and New Jersey.



Banana Sirup

Making its debut in the food specialty line is Kanana Syrup produced by Kannengiesser & Co., New York, N. Y.

The new product is made from dried banana flakes, sugar, water and artificial flavoring. Benzoate of soda is added as a preservative. The manufacturer states that the sirup is the first item of its kind on the market.

At present, it is being offered to consumers in small glass jars of 9 oz. net weight. The wrap-around label is red, white and yellow in color, and on the back are listed many interesting uses of the sirup: In frostings, on cereal, on ice cream, in cakes, and cookies.

After being test-marketed in metropolitan New York, the product will be distributed nationally. And if demand warrants, larger containers will be used.

Almost three years of experimenting were necessary to perfect the new product. However, the company frankly admits that the sirup was first produced accidentally when the chemists were developing a new type of pudding from the tropical fruit.

—*End*

Get fresh-fruit flavor that will match The best you'd find in a strawberry patch...

Use NORDA STRAWBERRY FLAVOR

Your products will please more people, if you use Norda Strawberry Flavor. They're bound to be more popular, and here's why...

Norda Strawberry is crammed with the *real strawberry* taste. The flavor is true to the fruit... it's rich with the fresh-picked goodness that makes strawberry so appealing.

Improve your gelatins, syrups, mixes, frostings, and your candies with genuine or fine imitation Norda Strawberry. Use it to make your products sell better and faster every day.

You can't tell till you test it... send *now* for free samples of Norda Strawberry. Get your Norda Flavor Catalogue, too. Write, wire, or call today.

Norda Strawberry...

Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.

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"Progress depends on New Ideas and Improved Service"

Modern Marvel of the Can World

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S-P-R-A-Y-S Out!

After years of popular thinking that "cans are just cans," along came Crown with a revolutionary new type of can which dispenses Whipped Cream, Plastic Coatings, Insecticides, Deodorants and other products under pressure. Spra-tainer's patented no-side-seam, no-top-seam construction is ideal for pressure use. Would this can improve sales for your product? Ask to have a Crown Sales Representative call.

One of the World's Largest Can Manufacturers **CROWN CAN**

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Food Industry News

Food Production Tops Truman's Plans For Development Under Point 4

Food processors, like most other U. S. businessmen, need not expect a sudden business boom from President Truman's famous "Point 4" program to develop the under-industrialized areas of the world. The Administration has decided to move slowly on its so-called "bold new program."

Food production, of course, is the key problem in most of the world's overpopulated, underdeveloped countries. Raising the per capita production of foodstuffs is the first step in real industrial advance. The grueling day-to-day struggle of its citizens to get enough to eat makes it impossible for the poorer countries of Asia and Africa to shift any appreciable percentage of manpower to the production of other goods.

This situation lies behind the current decision of the government planners to put the major emphasis on technical assistance, or "show-how," rather than on capital investment.

Truman's technical assistance program will call for an appropriation of about $50,000,000 in addition to the $20,000,000 already in the 1949-50 budget for this work. The $50,000,000 would be split among the four agencies that now receive U. S. funds in this field: United Nations, Economic Cooperation Administration, Institute of Inter-American Affairs, and the U. S. Interdepartmental Committee on Scientific & Cultural Cooperation.

Guaranteed Investments

The second, or financial, side of Truman's "Point 4" program will propose guarantees of U. S. investments abroad, tax incentives, and negotiation of new commercial treaties that would include specific provisions as to treatment of U. S. investments in the countries involved.

Realistically, it appears that the farm equipment and food equipment producers in the U. S. are more apt to find Point 4 of interest before food processors see anything in it for them.

The only immediate demand that Point 4 will make on the U. S. food industry is for personnel. The agencies now working on assistance to foreign countries are swamped with demands for experts to help solve agricultural and food problems abroad. These requests are not only for agronomists, fertilizer experts, and the all-around agricultural extension worker, but also for experts in milling, food preservation and transportation—mainly for technical problems of a very primitive sort.

Present funds supporting this kind of international assistance are meager, by almost any comparison. The whole budget of the United Nations Food & Agriculture Organization is only $5,000,000 a year, for instance. And it is trying to serve 50 countries. However, the cost should not be great.

When the program gets going, it is anticipated that most of the experts will not be needed permanently. Instead, specialists in particular problems will work for relatively short periods—perhaps six months to two years. When the work of the first group of experts on a particular project is completed, another group may be required.

Anti-Water Pollution Laws Begin To Take Form

The Public Health Service is getting a headstart in carrying out the new Federal anti-water pollution law. One step already taken could have far-reaching effects:

PHS has conferred with state officials to suggest a comprehensive state pollution law as a model for the states to adopt. Many state pollution laws are rather sketchy. Frequently they were passed solely to meet some particularly critical pollution problem. Many of them list exemptions—industries that are specifically excluded from the impact of the law. Now PHS has written a model law, which includes what it believes to be the best features from the various state laws.

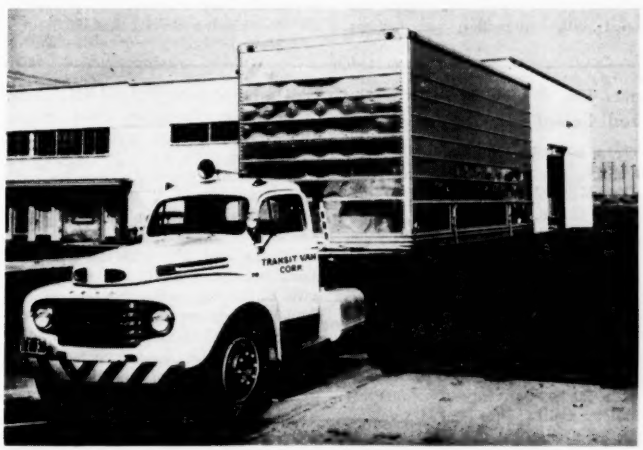
State pollution officials are all for modernizing their state laws—and in view of the new Federal activity in the field, state officials are going to step up their own activities.

Federal officials are leaning toward a "go slow" policy. They had considered getting off to a fast start this summer, perhaps by concentrating most of their personnel in a single area—like the Ohio River. The idea was to make the most dramatic impact (a) on industry (b) on municipalities (c) on the public and (d) on Congress, to which the agency must return in another year for its appropriation.

Now, the government pollution experts have decided to be conservative, rather than bold. They'll focus their attention on known pollution sore spots. These include the Ohio, the Missouri River, and others.

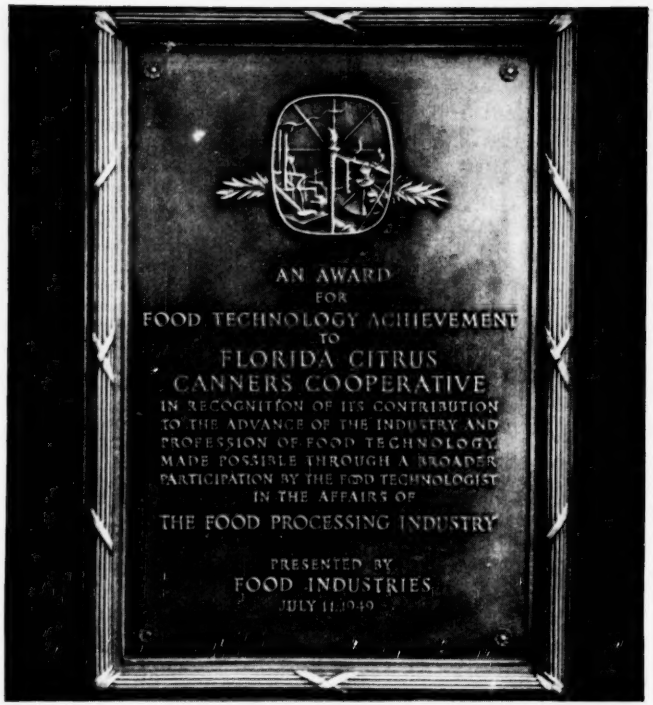
Division of Water Pollution Control is now talking water conservation as their main problem, not just water pollution. This is the sort of thing they're thinking of: there should be certain priorities established on the use of river water.

(Industry News Continued)



Bulk Hauling Container

Easily transferred from one form of transportation to another, this new type bulk container is being developed by Transit Van Corp., Redwood City, Calif. Less-carload shipments can be transferred intact from truck to rail to aircraft in a few minutes. The van has wide application, not only in the food industry, but in most fields.



Juice Freezer Wins FI Award

Florida Citrus Canners Cooperative wins the 1949 FOOD INDUSTRIES Award for achievement in food technology. Its frozen concentrated orange juice process is judged the most outstanding of the entries in the Second Biennial FI Award competition. A committee of 26 food technologists connected with universities and colleges, headed by Dr. S. C. Prescott, made the selection. The award is the 18x26-in. bronze plaque shown above. It will be presented on July 11 at the annual meeting of the Institute of Food Technologists in San Francisco. The story of the process, which has wide application, will be in the July issue of FI. The first award, in 1947, went to Atlantic Coast Fisheries for developing the automatic fish filleting machine.

Sales Up, Profits Down Food Companies Show

Sales up and profits down appeared to be the rule among food companies in the financial reports appearing during the month.

Libby, McNeill & Libby revealed sales of $153,574,246 for the year ending February 26. This compared with sales of $145,370,616 made the previous year. Net earnings were $3,809,933, compared with $5,366,394. With the purchase of a vegetable cannery at Rochester, Minn., and the modernization of the company's peach cannery at Gridley, Calif., President Daniel F. Creeden announced the completion of the expansion program begun five years ago.

Altes Brewing Co., Detroit, showed the biggest net sales in the company's history, in 1948—$16,338,558. Net sales in 1947 were $13,368,953. Net earnings, on the other hand, were $1,005,524, compared with $1,100,001 in 1947.

Canada Dry Ginger Ale reported net sales of $50,192,244 in 1948, as against $45,106,029 during the previous year. Net income was just enough under to bring the company into the up and down category—$2,701,273 compared with $2,701,776. (Further details of Canada Dry's report appear in next column.)

E. J. Brach & Sons reported $38,-244,457 in net sales for 1948. Net profit for the year was $3,220,209. No comparable figures for 1947 appeared with the report.

Creameries of America deviated from the trend in 1948, reporting a drop in sales and an increase in net earnings. Net sales for the year were $38,810,916, as against $39,234,549 for 1947. Net income came to $862,843, compared with $746,687 the year before.

The Best Foods' consolidated net earnings for nine months, ending March 31, amounted to $3,925,326, compared with earnings of $6,873,095 during the same period of the previous year. The company also transferred $602,000 from the reserve for contingencies to earned surplus. This reserve had been set up to cover the inventory declines of the company's major raw material, edible vegetable oils.

General Foods' first quarter net sales were $127,802,860, compared with $120,027,500 in the like 1948 period. Net earnings, after provision for income taxes were $7,593,797, against $8,155,176.

Standard Brands' net sales for the first three 1949 months totaled $62,-906,640, a decrease of more than 13 percent from the $72,884,614 in the first quarter of 1948. Net earnings for the period were $1,786,370, compared with $2,913,328.

Canada Dry's Expansion Treated In Report

Eighty new bottlers, investing more than $10,000,000 in plants and equipment, were licensed and started production of Canada Dry's complete line between November 1947 and the end of 1948, the company's annual report reveals. The company also added seven new plants of its own for which markets are being developed.

This broadening of its licensing program and expansion of its own production centers, are in line with the company's altered policy of aggressively promoting 7 oz. bottle sales. While the largest volume of sales has always been the 28 oz. bottle, the report says, it is the small "nickel" bottle that today offers the largest undeveloped opportunity for expansion and growth. Costly shipments to distant markets, the report continues, are not feasible with the smaller units, since marketing is profitable only within a radius of 35 miles of the plant.

It was due in large part to the costs of this expansion program that 1948 earnings remained at practically the 1947 figure, despite a gain of over $5,000,000 in sales volume.

Fluorescent Tube Dangers Greatly Exaggerated

Hazards in handling fluorescent tubes have been highly exaggerated in recent "warnings", according to lighting authorities, who say these tubes are no more dangerous than most electrical equipment. One manufacturer points to the more than 500,000,000 lamps

used since 1938, with only an infinitesimal number of inflammations traceable to beryllium poisoning.

Accidents, they point out, are generally due to careless disposal. Used lamps should be broken outdoors, in a waste disposal area. Each tube should be returned to its original container before being broken. If a great many tubes are to be disposed of, it should be done in a waste-container fitted with an exhaust hood.

Tubes should not be burned in an incinerator, since beryllium fumes can be formed, endangering the attendant, who might breathe them. Added protection can also be afforded the attendant if he wears heavy gloves. Cuts from tubes should get immediate attention, preferably by a doctor.

Salmon Earnings Cut By Alaska Taxes

Taxation measures that will cost salmon canneries up to $5,000,000 a year have been passed by the Alaska Territorial Legislature and signed by Governor Ernest Gruening.

An estimated $2,000,000 annually is expected from a tax of 2 percent on canned salmon, based on the Seattle wholesale value between August and October.

The graduated fish-trap tax is four times that of last year. It starts at $1,200 per trap for one to three traps and rises to $3,200 per trap for companies with more than 50. In addition, a tax must be paid on each trap-caught fish, beginning after the first 15,000 fish. The tax amounts to 5c. for each fish between 15,000 and 50,000 caught in any one trap and increases to 25c. for each fish over 200,000 in any one trap.

Other taxes include a 1 percent property tax, an income tax equal to 10 percent of the federal income tax, a gross business tax of ½ of 1 percent, fishing permits of $5 for resident fishermen and $50 for nonresidents.

Synthetic Fats Called Potential Food Aid

World shortage of food fats has led FAO to survey the potential contribution of fats produced synthetically through oxidation of petroleum fractions, or from other non-food raw material. A special report has been prepared by the Nutrition Division and released as FAO Nutritional Studies, No. 2, "Synthetic Fats."

Direct use of such products as human food "cannot be recommended from a safety standpoint because of their toxic effect." But such materials would contribute indirectly to food fat supply by their utilization in soaps and detergents, releasing edible fats for food usage.

The committee report recognizes that the cost of synthetic fats is still much higher than that of natural fats. It expresses the hope, however, that industrialization may lower the cost to a competitive level shortly after commercial production begins. Only previous commercial manufacture reported was a prewar German plant at Witten, which had a rated capacity of 31,000 tons of fatty acids per year.

Judge Doubts Federal Law In Chicago Dairy Case

Dismissal of anti-trust indictments against eight Chicago dairies and nine of their officers has been refused by Federal District Judge John P. Barnes, although he said he doubted the constitutionality of the Robinson-Patman Act.

Three indictments are involved. The first charges defendants with conspiracy to violate the Sherman anti-trust law by allocating among themselves business from wholesale milk dealers. The other two charge Borden Co. and Bowman Dairy Co. with violating the Robinson-Patman Act by giving rebates to chain stores.

The Robinson-Patman Act, which became law in 1937, is designed to prevent companies from discriminating against one or more customers in favor of others. In denying the motions to dismiss the milk company indictments, Barnes said he was acting in accordance with a United States Supreme Court admonition that questions involving constitutionality should be decided only after full hearings. The three indictments were returned by a Federal grand jury last July 30, after a ten-month investigation of high living costs in Chicago.

Other dairies named were Beloit Dairy Co., Western United Dairy Co., Capitol Dairy Co., Hunding Dairy Co., Meadowmoor Dairies, Inc. and American Processing & Sales Co., operator of Hawthorn-Mellody Farms.

FAO Allocations

Review of the world food situation has resulted in almost complete elimination of allocations under FAO. Wheat and wheat flour allocation were discontinued in April, following the termination of fat and oil control in February. Cocoa beans remain under allocation until September 30, after which the best guess is that they will go into a free market. Continued control of rice for another year has been recommended, and seemingly will be continued under control by formal FAO vote this month.

(Industry News Continued)

TITEFLEX Filter Model 5A 1000 showing porous membrane.

One of the many economies of the **Titeflex** *Filter*

CLEANING of the TITEFLEX Industrial Filter requires only 7 to 20 minutes, depending upon the size of filter and type of solution being filtered. A new method of backwashing simplifies the entire cleaning process, eliminates waste labor, and completely removes all residue.

Other important savings made possible by the TITEFLEX Filter are:

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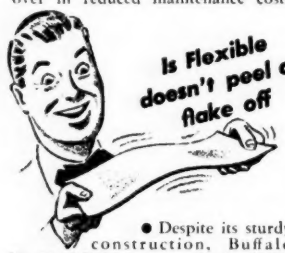
The firm bond of its plastic coating to the sturdy body of the belt beneath gives Buffalo PlasTex* Belting unsurpassed durability under exacting conditions of service. PlasTex* is odorless, and impervious to moisture, oils, acids, alkalis and greases — pays for itself many times over in reduced maintenance costs.



● Despite its sturdy construction, Buffalo PlasTex* Belting is completely pliable — won't crack or peel. It's easy to keep clean by brushing, washing, or application of live steam.

Join the hundreds of food processors who are enjoying the benefits of this versatile belt in their plants—use Buffalo PlasTex* Conveyor Belting. See your distributor, or write *today* for full information and *free* sample.

*PlasTex is the registered trade name for Buffalo Weaving & Belting Company's plastic-covered belting. Makers also of RF & C (rubbered covered), latex, solid-woven cotton, and glazed (nitro-cellulose coated) beltings.

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Who Speaks For Processor?

The Agricultural Research Policy Committee, with the chairman, Secretary of Agriculture Brannan, at a recent meeting in Washington. Congress provided for establishment of the Committee, whose responsibilities include advising the Secretary of Agriculture on overall agricultural policies having to do with research and related educational and service programs. The eleven members represent segments of the agriculture and food industries, and at least six of them must represent producers.

Left to right: C. Kitchen, United Fresh Fruit & Vegetables Assn.; F. Bailey, National Grange; H. Babcock, Cornell U.; R. Coker, Coker's Pedigreed Seed Co.; Brannan; W. Randolph, Alabama Farm Bureau Federation; A. Brock, California Department of Agriculture; A. Mitchell, New Mexico Cattle Growers Assn.; J. Davis, National Council of Farm Cooperatives; and H. Reed, Purdue School of Agriculture and Indiana experiment station and extension service. J. Patton, National Farmers Union, is not in the picture. C. Glen King is the 11th member.

PROCESSING

Grants for Food Research Listed by Iowa State

Agricultural research at Iowa State College recently received gifts and grants totaling $11,550.

Amounts and projects for which they are earmarked include $3,000 from Pure Carbonic, Inc., Chicago, for study of the preservative effect of carbon dioxide gas on fresh and cured meats. . . . $1,500 from the Research & Marketing Administration to study marketing methods in relation to quality maintenance in shell eggs. . . $1,200 from the Research & Marketing Administration to study changes in demand affecting the marketing of farm products. . . $1,200 from the American Jersey Cattle Club, Columbus, Ohio, to develop better methods of estimating breeding value of dairy cattle and determining relationship between type classification and production records. . . . $1,000 from the Research & Marketing Administration for basic investigations of subjective tests for quality. . . . $1,000 from the American Potash Institute, Inc., Washington, D.C. for study of the availability of potassium in high-lime soils. . . $1,000 from the Popcorn Processors Association, St. Louis, Mo., to support research in popcorn improvement. . . $600 from the Middle West Soil Improvement Committee to study methods of fertilizer application on farm crops. . . . $500 from Northrup King & Co., Minneapolis, Minn., to encourage fundamental research in vegetable crops. . . . $300 from the Tennessee Corporation Research Laboratories, College Park, Ga., for study of use of fungicides in control of leaf blight and fruit diseases of tomatoes and potatoes. . . $250 from the Iowa Milk Driers Association, Ames, to determine the place of dried milk in poultry rations.

Bread Standards Hearings Create More Controversy

Fundamental policy difficulties now beset the bread standards hearings of Food & Drug Administration. These are regarded as serious enough to raise the question whether an entirely new approach is going to be necessary in standards drafting in order to avoid a complete breakdown of this program of quality control and consumer protection.

Early this year it appeared to most observers that the drafting of a standard of identity for bread, though complex, was merely a question of taking testimony and analyzing dietetic and technical questions of the usual sort. Proceedings during the last two or three months have made it evident

that more than this is involved. The question now in the minds of those involved is whether any standard for bread can possibly be formulated under the present proceeding without first facing two or three new issues. Actually, it is now regarded as debatable whether any standards of identity for such foods can be formulated without making them standards of minimum permissable quality.

This complication has arisen in the controversy over the suitability of certain chemical additives widely used by bakers under various names as bread softeners, anti-staling agents, emulsifiers, and other descriptive names, which imply real or claimed advantages. The three issues which have arisen may be briefly stated as follows:

1. Are these chemicals safe—that is, are they free from any toxicity, either acute or cumulative?

2. Does the use of these materials cause consumer deception through a false appearance of "freshness"?

3. Does the use permit an economic cheat?

There are various types of materials offered for one or more of the purposes implied by the names or descriptions used. The question of safety of use has been very critically considered at

(Industry News Continued)

Moves Up at Armour

Victor Conquest, Director, Chemical Research & Development Department, Armour and Company, has been given charge of all scientific research and development activities of all divisions of the company including Armour Fertilizer Works, Armour Leather Co., and all domestic and foreign subsidiaries and affiliates. This expansion in scope of department activities is a fundamental change in company organization. In his new capacity, Mr. Conquest will report directly to the company president, F. W. Specht, and will have a larger part in company planning and policies.

Everyone has problems

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When iron enrichment is desired, the selection of another Victor product, sodium iron pyrophosphate, has an advantage because it is a unique form of iron which is compatible with fats and oils and will not induce rancidity.

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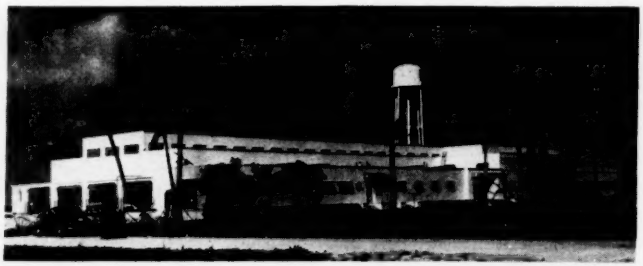


New Florida Plant

Described as an ultramodern $1,000,000 freezing and canning plant, this new processing outlet for Florida fruits and vegetables was recently opened at Uleta, 12 miles north of Miami. Built under the aegis of Mar-Ena Food Products Co., Hollywood, Fla., the plant was incorporated under the name Avena Foods, Inc. Production is 3,000,000 lb. of frozen food and 12,000,000 cans of fruits and vegetables.

the hearings, with testimony from several highly skilled toxicologists.

Both acute toxicity tests and long feeding tests have been carried out carefully and reported in detail. It appears that Food & Drug Administration is satisfied that there is no public health hazard in the use of these materials. If that were the only question that had been raised there would be no point in fretting about policies. But from this scientific point the controversy has ranged and raged into several new areas.

Some marketers of these additives claim that the bread stays fresh much longer when they are used. This has raised the question in the official mind as to what the housewife expects when she buys a loaf of "fresh" bread. Some housewives merely squeeze several loaves and think the softest one has been most recently baked. A certain measure of deception may therefore be involved in the use of chemicals that are definitely softeners. But this factor may be no more serious, some have demonstrated, than merely the slicing of bread. The "bread squeezer," they say, ceased to get any useful result from the squeeze when sliced bread came into fashion. The additional uncertainty from use of softeners, therefore, should hardly be considered a significant deception. At least that is the argument of additive proponents.

USDA Grade Standards

Quite a number of commodities have been covered by recent grade standards actions of U. S. Department of Agriculture. Among the most important are frozen strawberries, dried figs, potatoes, and canned red sour (tart) pitted cherries.

Frozen strawberries are now covered by the fourth amendment to the grade standards, effective May 1, superseding the third edition, effective since May 17, 1948. Principal changes in the revised standards are relaxed tolerances for short stems, and incorporation of grades of frozen strawberries for manufacturing. Federal inspection certificates covering frozen strawberries under the grades for manufacturing describe the various factors of quality, rather than scoring the berries on a numerical system as is done for frozen strawberries *not* for manufacturing. The current revision was published on page 1507, *Federal Register*, April 2.

Revise Dried Figs

Dried fig grade standards are in process of revision in accordance with the proposals on page 1795, *Federal Register*, April 14. Principal changes in the grade standards are incorporation of grades of dried figs for manufacturing purposes, clarification of some of the terms defined in the original standards, deletion of some of the tolerances which had occasioned difficulty in operation of the first standard, and inclusion of new tables giving detailed allowances for defects of the various styles of dried figs. These tables were designed to simplify the use of the grade standards by industry. Further use of this type of presentation is planned if the reaction to PMA is favorable.

Potatoes are now covered by revised U. S. standards effective June 1, as published on page 1955, *Federal Register*, April 22. (The principal changes were outlined in FOOD INDUSTRIES, April, page 150.)

Canned red sour (tart) pitted cherries are to be covered by the fifth revision of the USDA grade standards for this product, in time for the 1949 pack. Proposed changes were printed

on page 2068, *Federal Register*, April, 27, and comments were requested by May 27. Principal changes clarified the section "Absence of Defects."

Frozen red sour (tart) pitted cherries were also to be covered by a revised standard scheduled to appear in an early May issue of the *Federal Register*. The effective date for this revision was also expected to be prior to the 1949 pack.

Frozen concentrated orange juice final order was also expected in early May. This was a new standard (See FOOD INDUSTRIES, April, page 150), covering only the usual three-to-one concentration of juice with nothing added.

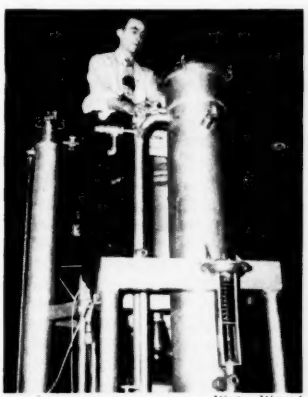
Canned citrus juices, first proposed last fall, was scheduled for further criticism by industry. Principal difficulty in issuing a first standard was to reconcile various Brix-acid ratios, which are experienced in various parts of the country with different types of fruit.

F&DA Food Standards

Food & Drug Administration's recent activities in the field of food standards include the following final order:

Canned potatoes may now include "purified calcium chloride, calcium sulphate, calcium citrate, monocalcium phosphate, or any mixture of two or more such calcium salts, in a quantity reasonably necessary to firm the potatoes, but in no case in a quantity such that the calcium contained in any such

(Industry News Continued)



Wide World

Pilot Evaporator

Food technology studies got a boost at Illinois Institute of Technology when this pilot model evaporator was set up to produce concentrated foods and juices at low temperatures. Senior Harry Clew watches the operation.

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Grocery Store Products Co.
Hunt Foods, Inc.
Illinois Canning Co.
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Central Prepackaging

S. W. Kagen Co., Jersey City meat processors has begun prepackaging of meats at its central warehouse. Fresh meat cuts and dressed chickens are cellophane overwrapped in an air-conditioned room. A ceiling iron is seen here being used to make an airtight package. (*Photo—Courtesy Sylvania Div., Amer. Viscose Corp.*)

calcium salt or mixture is more than 0.051 percent of the weight of the finished food"—if the tentative order appearing on page 1769 of the April 13 *Federal Register* is confirmed without change.

No exceptions to this tentative order were filed within the provided period. An early effective date was expected because F&DA officially recognized in the tentative order that "the season for canning potatoes begins in some of the important canning areas in the latter part of May.

"During the 1948 packing season," stated F&DA "it was observed in Tennessee that the need for added calcium salts for firming potatoes was greater at the start of the canning season than it was later in the season."

Also announced were the following tentative orders:

Cheeses were covered by a lengthy tentative order beginning on page 1960 of the April 22 *Federal Register*. Approximately 16 pages were required to outline the 182 findings of fact in the record of that hearing, and an additional 16 pages were required to print the tentative orders for approximately 50 different cheeses. July 21 was the date by which written exceptions to the tentative order may be filed with Food & Drug Administration.

Salad dressings, frozen fruit, and *canned corn* tentative orders are now awaited from F&DA. The two former subjects were covered in hearings many months ago. The latter, canned corn, was the subject of a hearing that adjourned early in April.

Whole Kernel Corn

Standards of identity, quality, and fill of container will be covered. There is some possibility, however, that a standard of fill for canned whole kernel corn will not be issued until after further data are obtained on the 1949 pack. Officially, the record was closed, but if additional data are offered next fall, it is possible that the Administrator will accept them if a final order has not already been issued. A reopened hearing for that purpose might be necessary.

Bread meanwhile continues to be the subject of extended testimony in regard to various optional ingredients. Comparatively little progress was made in this hearing since our report last month. (See also the bread standards story in this issue, page 114.)

Informal hearings will be held, June

28, on standards of identity and quality for frozen asparagus and frozen peas and on quality for canned asparagus.

Bone Char Study Report Soon To Be Released

The National Bureau of Standards expects to release a full report shortly of the technical sessions on bone char research held last January. Fourteen formal papers and the substance of the discussions dealt with "bone char kilns, test procedures, filtration operations, and basic research on the properties of bone char."

Approximately 9,000,000,000 lb. of raw sugar are refined annually in the U. S. with the use of approximately half of this weight of bone char. The magnitude of this operation indicates the importance of developing efficient methods by which the char can be reused. For several years this problem has been the subject of fundamental investigation at the Bureau of Standards, under a project sponsored by sugar refiners and char manufacturers of the U. S. and other countries. Among the important factors being investigated is economy in heat utilization in the process of reactivation of the char.

The complete report will be announced by the Bureau as soon as it is ready for distribution, probably sometime in mid-Summer. Arrangements for sale of the document will be made known at that time.

Can Company Makes Grant To Study Tomato Juice

The George Washington Carver Foundation, Tuskegee Institute, has received from Continental Can Co. a grant of $2,000 for a period of one year to support a study of the morphological and biochemical characteristics of organisms causing flat-sour spoilage in tomato juice. Serious losses from this cause occur to packers of tomato juice from time to time.

Although many organisms have been isolated from such spoilage, there has not been published any significant study of the morphological and biochemical properties of these organisms since the original findings of Berry in 1932.

It is believed that a study of this type will provide fundamental information of value in the attack upon the flat-sour tomato juice problem.

Milling Scholarship

A four-year $1,000 scholarship, to be awarded annually to a freshman in the industrial milling department at

(Industry News Continued)

STAINLESS STEEL-BELT CONVEYORS
can cut meat-handling costs

Sandvik Designs and Builds Complete Units to Fit Specific Requirements of Meat or Fish Packing, Bacon Slicing, Boning Hams and other Operations.

SANDVIK stainless belt, meat conveyor with stainless steel work table adjacent. The work table has a range of adjustment from six inches below the belt up to belt level.

The outstanding feature of a Sandvik conveyor is the belt . . . a flat, continuous strip of solid, stainless steel. SANDVIK will incorporate this belt into a conveyor arrangement "tailored" for your application.

ADVANTAGES

EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly without danger of corrosion.

SMOOTH, IMPERMEABLE SURFACE—No place for food particles to lodge. No danger of taste contamination. Easy to slide large pieces of meat, on or off.

LONG SERVICE LIFE—The SANDVIK steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Entire unit designed to give maximum efficiency. Wide range of belt widths available. Lengths to meet any center distance. Height of belt from floor can be arranged to give correct working height despite special floor conditions. Painted framework is standard but can be galvanize dipped when required.

Write for complete information

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Conveyor Department
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SANDVIK steel belt conveyor in a fish packing plant.

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SS-28

MONARCH
CORROSION RESISTANT NOZZLES
Of

Fig. F-80

STAINLESS STEEL:

Available in capacities from .57 G.P.H. Fig. F-80 style illustrated, to 104 G.P.M. (Fig. B-8-A style).
"Hollow" cone, "Solid" cone, and "Flat" sprays furnished in pipe sizes and capacities to suit practically any problem where corrosive liquids are sprayed.

STONEWARE:

Monarch Fig. 6020 and Fig. 6040 stoneware sprays have replaced most other types of nozzles used in acid chamber plants throughout the world. Last almost indefinitely in sulfur gases and will not break or crack from temperature changes.

HARD RUBBER:

Patented Fig. B-27 nozzle is of the "non-clog" type, i.e. it contains no internal vanes, slots, or deflectors which might facilitate clogging. Available ¼" to 1" pipe. Small sizes produce a very fine, soft, wide angle hollow cone spray, even at low pressures. Fig. H-407 "flat" spray produces a relatively fine even sheet of liquid.

Write for Catalogs 6A and 6C

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Final Farm Production Goals for 1949, as set by the Department of Agriculture

Crop	Planted Acres (Thousands) 1949 Goals	1948 Actual	Percent 1949 Goal Is of 1948 Production
Corn	85,900	86,196	100
Sorghums, excluding sirup	13,704	13,703	100
Soybeans, for beans	10,273	10,311	100
Peanuts, picked and threshed	2,629	3,214	82
Sugar cane, excl. sirup	328	328	....
Sugar beets	800	800	....
Potatoes, Irish	1,938	2,127	91
Sweet potatoes	607	519	115
Beans, dry edible	1,800	1,971	91
Peas, dry edible	350	309	113
Truck crops:			
For processing	1,721	1,701	101
Fresh market	1,743	1,744	100
Oats	44,750	44,529	100
Barley	13,500	13,295	102
Wheat, all	71,850	77,749	91
Flaxseed	3,022	4,889	62
Rice	1,600	1,757	91
Rye	2,478	2,097	118
Livestock and Livestock Products			
Milk production on farms, mil. lb	120,000	115,511	104
Hens & pullets on farms, Jan. 1, thous. head	425,000	426,465	100
Chickens raised on farms, thous. head	700,000	635,036	110
Turkeys raised on farms, thous. head	35,100	31,950	110
Sows to farrow, spring, thous. head	9,490	7,967	119
Cattle and calf slaughter, thous. head	32,000	34,522	93
Stock sheep and lambs on farms end of year, thous. head	30,500	27,818	110

Kansas State College, Manhattan, Kan., beginning in September 1949, is being given by Fulton Bag & Cotton Mills. It will pay $250 a year so long as the winner maintains high scholastic standards and participates in extra-curricular activities.

All prospective freshmen milling students who are U. S. citizens are eligible to compete for the award.

To Study Ingredients

Dr. Franklin C. Bing, scientific director, American Institute of Baking, was recently appointed chairman of an American Public Health Association committee to study substances introduced in the production of foods and to make recommendations of actions to be taken to protect the health of consumers.

The committee will study problems involved in the use of insecticides and rodenticides and in the introduction of functional ingredients of processed foods from the viewpoint of public health.

DISTRIBUTION

Rule Out "Artificial" For MSG Labeling

Monosodium glutamate may be used in suitable quantities in meat products and all other foods without labeling the products "artificially flavored." This modification of labeling has been authorized both by Food & Drug Administration and by Bureau of Animal Industry.

It is, of course, expected that the presence of this savoring salt will be declared among the ingredients on the label as usual.

Formerly, there were a number of meat products, soups, and other foods, which had to be marked "artificially flavored" when containing this material. The old theory was that use of this agent might result in deception as in the case of synthetic flavors. Careful investigations which have been conducted for producers of glutamate, have disclosed that it merely stimulates the taste nerves. The enhancement of flavor natural to the foods contributes to palatability.

Permission to take advantage of these properties without the derogatory word "artificial" previously used was granted on April 19, by Food & Drug Administration and on April 22 in a memorandum to the meat inspectors of BAI.

Latest Price "Decision" Compounds Confusion

Food processors have been waiting for months for the Supreme Court to hand down its decision on the Rigid Steel Conduit case. That's the case that was supposed to give the Court a chance to clarify the confusion it generated when it struck down basing point pricing in its Cement Institute decision a year ago.

But now that the Supreme Court has acted, the situation has become more confused rather than clarified. Reason: The Court split 4-to-4, and handed down no decision and no opinions.

This leaves standing the lower court decision. It held that, under the Cement Institute decision, the use of basing point pricing system by the con-

duit makers was an illegal conspiracy that resulted in price fixing.

But more important, this lower court also ruled that a businessman who uses a basing point or delivered pricing system that produces identical delivered prices—with the knowledge that his competitors do likewise—is guilty of restraint of trade, under the Federal Trade Commission Act.

Hard to Prove Conspiracy

This is the point FTC wanted to establish. Its theory is this: It is tough proving an out-and-out conspiracy charge in delivered pricing cases, as it did in the Cement case. It takes thousands upon thousands of pages of evidence, records, etc., to prove that a conspiracy exists despite the absence of face-to-face price-fixing meetings around a table.

So, in the Rigid Steel Conduit case, FTC asked the court to make it illegal for a seller to use a basing point system when he and his competitors all knowingly use the same system.

The let-down of the Supreme Court's "no decision" again puts the spurs to Congressional action. It now makes virtually certain Congressional approval of the Democrats' proposal for a temporary "moratorium" on new delivered pricing cases in which there is no element of conspiracy.

And it also puts more steam behind the demand for permanent Congressional action that would tell businessmen what is legal and what is not, in the field of delivered pricing.

(Industry News Continued)

Wide World

Brokers Birthday Cake

Members of the National Food Brokers were not too sure that their tenth anniversary cake would attract all the attention it deserved, so they got United Air Lines to supply a plane and a pilot for this picture. Bakers will be interested in the results obtained here with only a knife and an empty bowl.

MODERN PAPERS *for modern packaging*

Picturesque, indeed, is the Hot Tamale Man with his hot tamales wrapped in real corn husks. But when tamales are produced by the millions, the corn husk must bow to a cheaper, more dependable wrap . . . such as a fine Rhinelander paper made for this purpose.

Comic buttons and various other small fry allure enclosed with cereal and confections boost sales enormously. Heat sealed packets made from a special Rhinelander paper separate these coveted little premiums from the products they so effectively sell.

Now these clever food processors not only package you a cake ready to bake but also a perfect frosting. They take the exertion and guesswork out of the procedure. And Rhinelander G&G* Task Papers take the guesswork out of the packaging!

*Glassine and Greaseproof the functional papers that do so many tough jobs well.

IN THE LAND O' LAKES • RHINELANDER, WISCONSIN

If you are doing these or similar processing operations, you will be interested in the complete story of the....

Kathabar SYSTEM

and how it eliminates high-humidity hazards in product quality control, and production.

Proved ... Again and Again in over 300 installations in the processing industries.

A PARTIAL LIST OF KATHABAR APPLICATIONS

CHEMICAL
Photographic Film Processing and Storage
Match Drying • Stencil Drying
Sensitized Paper Mfgr.
Drug & Pharmaceutical Mfgr.
Gelatin Capsule Processing
Glue Drying • Shellac Drying
Chemical Processing
Processing of Sodium
Vitamin Mfgr.
Gunpowder Processing
Processing Plastics
Rocket Powder Processing

MANUFACTURING
General • Ceramics Drying
Storage of Highly Finished Metal Parts (Corrosion Preventing)
Compressed Air Drying
Covered Cable Drying

METALS INDUSTRY
Powdered Metals Processing
Cupola Dry Blast (Foundry)
Safety Glass Manufacturing
Magnesium Castings Production
Aluminumizing Process

FOOD
Drying of Icings—Bakery
Candy Making • Fish Drying
Bean Sprout Cultivation
Vegetable Dehydration
Processing Powdered Coffee
Cranberry Dehydration
Milk Drying
Spaghetti Mfgr.

LEATHER
Shoe Drying

PRINTING AND PAPER
Cellophane Printing
Color Lithography & Printing
Paper Making

TEXTILE
Rayon Storage
Nylon Hosiery Knitting

MISCELLANEOUS
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Keeps It Frozen

Here is a lightweight, low cost, throw-away frozen food container that will hold its contents safely up to 24 hours. Developed by a Cleveland shrimp packer, it utilizes Fiberglas insulation, which is placed over an inner carton, as seen here. An outer carton is then slipped over the Fiberglas and the frozen food is ready for shipment.

Corn Products Dubious Over Market Outlook

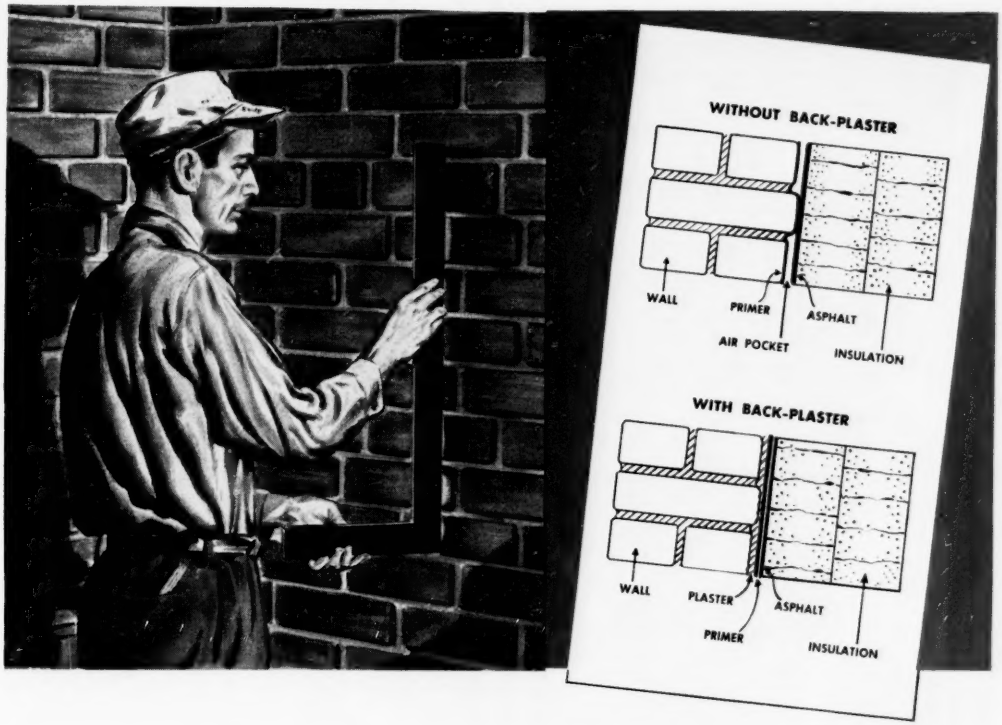
Although Corn Products Refining Co. has just completed an ultra-modern wet milling plant, at Corpus Christi, Tex., to manufacture starch, oil and dextrose from sorghum grains, the management has not been happy over the outlook for markets.

John R. Rhamstine, vice-president, discussed the situation last month with the Nueces County Navigation Commission, under whose direction a barge canal extension to the plant was completed late in March. Corn Products had planned to erect a dock on the canal at the plant.

Mr. Rhamstine said, "We undertook construction of the new plant to produce starches for export and dextrose sugar to supply the U. S. West Coast. At that time (October 1946), it appeared that the demand for starch for export would require the capacity of the proposed new plant, or about 50,000 tons a year. Most of this starch was to be shipped to England. Since that time, lack of dollar exchange has brought England to discontinue purchase of starch in this country, and many other foreign countries find themselves in the same exchange situation.

"Until these former customer countries obtain more dollar credit, we cannot expect much export business. This is a condition that could change for the better suddenly, or continue on the present basis, or possibly get worse

(Industry News Continued)



Does it pay to back-plaster?

To the eye, a wall against which you're going to erect insulation may look smooth enough. Why go to extra trouble and expense to cover it with back-plaster first?

Run a straightedge over the surface of that wall, and you'll quickly discover the reason. Hollows and high spots will show up, leaving "pockets" through which you can see light.

If you lay up corkboard against the wall as it is, two things can happen: (1) the hot asphalt will adhere only to the high spots, so the bond between insulation and wall will be weakened: (2) vapor from outside will eventually collect in these pockets. If temperatures are low, the vapor will freeze, bulge out the insulation, and destroy its efficiency.

These aren't theories. They are facts observed by Armstrong's engineers during the more than 40 years Armstrong has been handling low-temperature insulation work. Like every other Armstrong specification, back-plaster is based on broad experience as well as good engineering practice.

When you have a low-temperature insulation job coming up, talk it over with an Armstrong engineer. He's near by, in one of Armstrong's district offices. A phone call will reach him. And when you entrust your insulation work to Armstrong's Contract Service, you'll get good materials and fine workmanship as well as sound engineering advice.

For full details, write today to Armstrong Cork Company, 4206 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATION

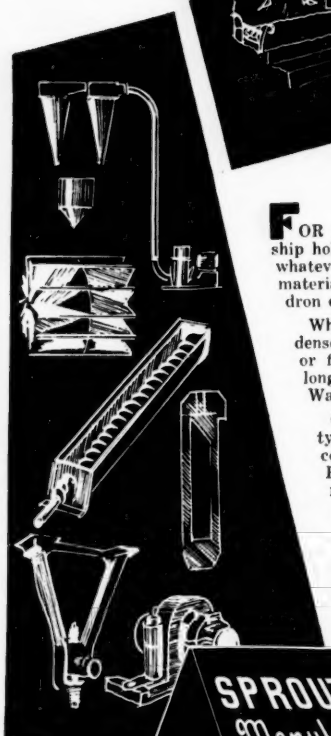
Complete Contract Service For All Temperatures

From 300° Below Zero

To 2800° Fahrenheit

Is yours a problem of

BULK MATERIALS HANDLING?



FOR conveying in process from bins, silos, ship holds or in and out of railway cars . . . whatever the job, as long as it's handling bulk materials, you can benefit from Sprout-Waldron experience and ingenuity.

Whether your materials be light or heavy, dense or bulky, fragile or abrasive, coarse or fine—whether your runs are short or long, horizontal or vertical, consult Sprout-Waldron.

Our facilities embrace a wide range of types and sizes in bucket elevators, belt conveyors, and screw conveyors. There's PNEU-VAC, too—a modern and truly remarkable means of conveying many materials via air.

For prompt consideration of your requirements, write
SPROUT, WALDRON & CO.,
35 Waldron St., Muncy, Pa.

SPROUT WALDRON
Manufacturing Engineers
MUNCY · PENNSYLVANIA

before improving. All of this adds up to uncertainty for us and led to our decision on dock construction."

He added that there should be no change in the company's original thoughts on the volume of dextrose sugar shipments to the West Coast.

The Corn Products plant is the first wet milling installation designed to process sorghum grains. It was built at Corpus Christi largely because of the availability of natural gas and the growing in that vicinity of a dwarf variety of grain suitable for combine harvesting.

See Imports From Europe As Next ECA Problem

With production in the Marshall Plan countries rolling ahead of schedule, ECA's Paul Hoffman sees that his next big problem is how to help the Europeans earn more dollars for themselves, once the U. S. stops giving them dollars through ECA to offset their present unfavorable balance of trade.

Hoffman's answer: Cut through the red tape of exporting to the U. S., and show the Europeans how to sell more of their goods—including more food products—in the American market.

Here are some of the food products that will be emphasized: Wines and cheese from France; olive oil and olives from Greece and Italy; butter, cheese and dairy specialties from Denmark; beer from Germany; canned puddings from England; sardines,

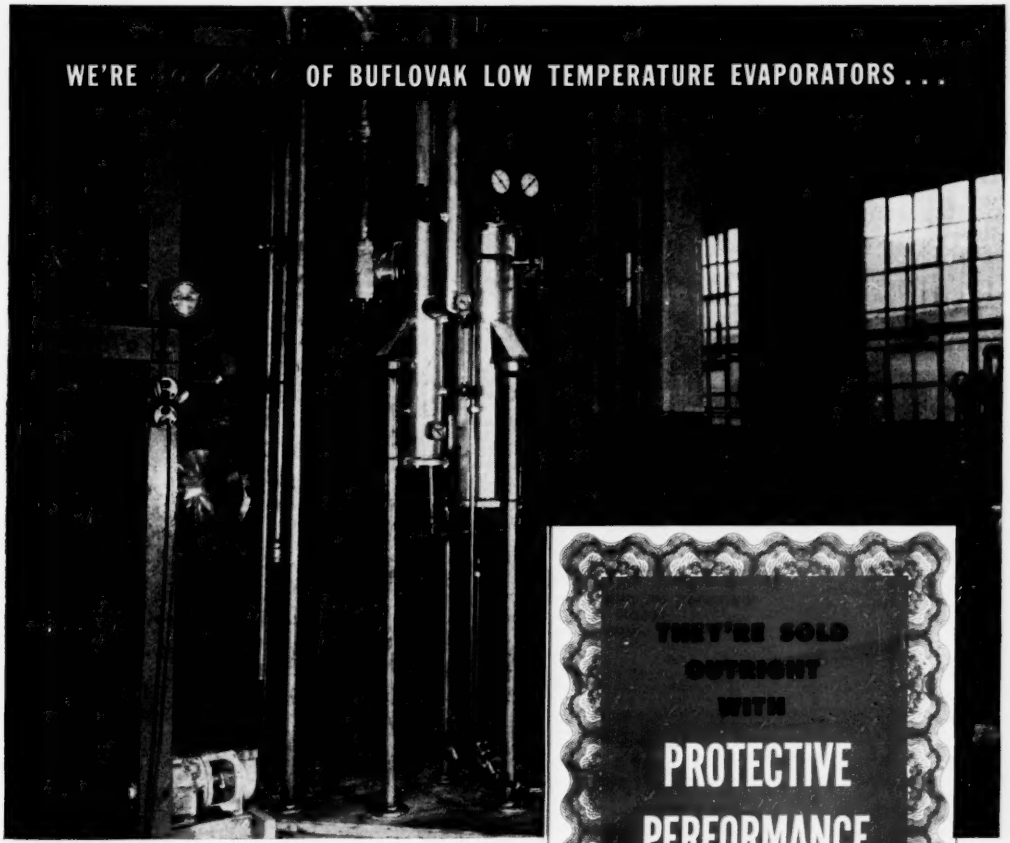
(Industry News Continued)

British Combine

Fish-Crate Liner

An aluminum liner that can be easily removed from the wooden fish crate has been designed in England, by C. W. Saunders. Easy to clean, the liners are now being used by the Hull Merchants' Amalgamated Box Co., Ltd., and are recommended by the United Nations committee.

WE'RE [illegible] OF BUFLOVAK LOW TEMPERATURE EVAPORATORS . . .



THEY'RE SOLD OUTRIGHT WITH

PROTECTIVE PERFORMANCE GUARANTEES!

Here's *why* we issue "Protective Performance Guarantees" with Buflovak Low Temperature Evaporators. We know their quality . . . and we know they protect the quality of the most delicate materials!

Thus, you get *safe treatment* for many Food or Chemical products.

Buflovak's Low Temperature Evaporator operates at extremely low temperatures and pressures. Day after day you are assured dependable operations, with long operating periods. Automatic controls simplify operation, save labor, and give uniform results, even to the density of the product.

Buflovak Equipment *always* gives high product quality at low production cost.

Write today for full information on these Low Temperature Evaporators or Buflovak Equipment for processing Chemicals and Foods, DRYERS, SOLVENT RECOVERY and PROCESSING EQUIPMENT.

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Division of Blaw-Knox Co.

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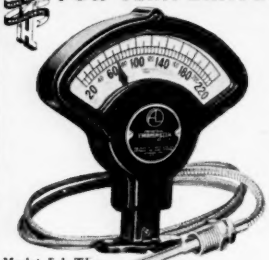
Depend on
AUTO-LITE
FOR TEMPERATURE INDICATION



Dependable temperature indication by Auto-Lite points the way to many savings in manufacturing and storage operations. It is sensible economy to have one of these low-priced accurate thermometers wherever temperature is an important factor. Write for folder describing the many types and styles of Auto-Lite Thermometers, dial sizes, temperature ranges and prices.

Model F-1 Thermometer priced from $22. Choice of Temperature Ranges.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION, DEPT. F-4
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INDICATING & RECORDING THERMOMETERS

TERRISS STAINLESS STEEL FOOD PREPARATION WARE

BATCH CAN

MIXING BOWL

MEASURING CUP

PITCHER

PERFORATED SPOON

TRAY

Terriss manufactures a complete line of Stainless Steelware for use in food and processing industries. Our special order department manufactures to your specifications. Send blue prints for quotations. Also available are pails, measures, stirrers, funnels, jars, etc.

DIPPER

TERRISS
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MANUFACTURERS SUPPLYING THE PROCESSING INDUSTRIES
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herrings, fish oils and other fish products from Norway and Iceland.

While food imports from Europe have not made much of a dent in the postwar U. S. market, European manufacturers of other kinds of products have shown that they can sell successfully here. Small British cars have sold widely, Italian sewing machines are getting started, German toys and cameras have bright prospects.

Tariffs as such are not a problem, as Hoffman sees the situation. Instead, he has enlisted the help of the State Department, the Treasury and the Department of Commerce to simplify the red tape that goes hand-in-hand with importing into the U.S.

Treasury is drafting legislation to clarify customs rules so that Europeans can know in advance their landed costs. Commerce is asking Congress to set up more "foreign trade zones," including one in the mid-West, perhaps Chicago. And plans are afoot to hold in the U. S. an annual international trade fair, similar to those held for hundreds of years in half a dozen European cities.

Peanut Problems Discussed At Industry Meeting

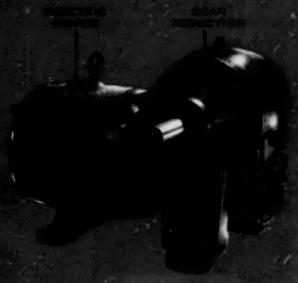
Interest in better quality peanuts and greater efforts to stimulate consumer demand featured the first national peanut industry conference, in Washington. The conference, held in April, was sponsored by the National Peanut Council in conjunction with its annual convention. All segments of the industry, including growers, shellers and manufacturers attended the meeting.

The Council adopted the completely rewritten NPC by-laws and decided to move its headquarters from Atlanta to Washington.

It was generally agreed that the moisture tolerance of peanuts as received from growers should be somewhere between 5 and 7 percent, although B. M. Birdsong, Suffolk, Va., stated that it should be 9.5 percent. It was decided to explore the moisture problem before taking action. M. E. Shell, speaking for the Southwestern Shellers Association, recommended that a bonus be paid growers for low-moisture content peanuts, and that a penalty be exacted when tolerance is exceeded. He said that his group was the first to ask for moisture limits.

William K. Kuehn, Minneapolis, was elected chairman of the Council to succeed Ralph McMillan, who was named vice-president and chairman

(Industry News Continued)



Don't put up with make-shift assemblies when it is so easy to get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

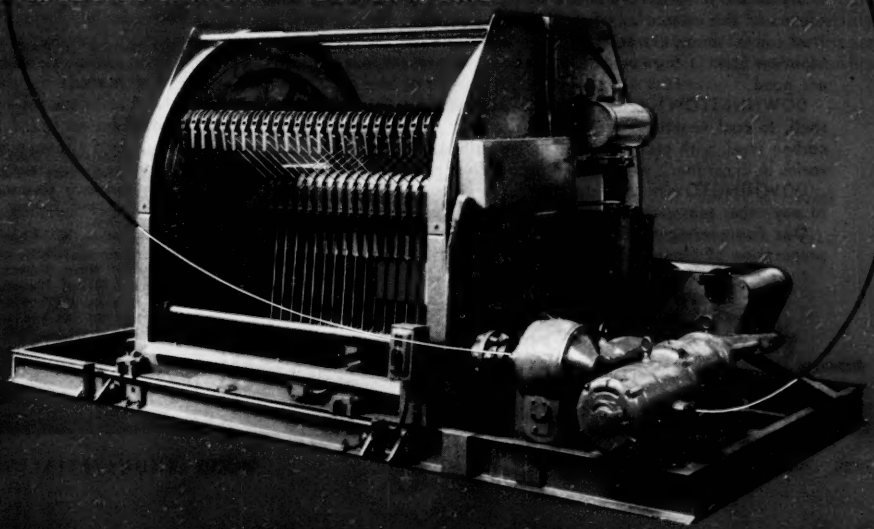
Master Motors are available in millions on millions of types and ratings (up to 150 HP) giving you a selection you can get nowhere else. This permits you to choose a power drive for each job that's just right . . . a power drive that will add greatly to the compactness, appearance, safety, and economy of each of your motor applications.

See how the designer of this brick making machine has used two different Master units that are just right for his purpose . . . one, a motor with right angle worm gear unit, the other a motor with parallel shaft reduction unit and an electric brake for quick controlled stopping.

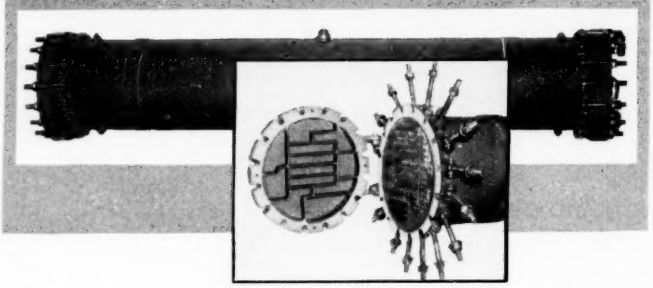
you can always be right

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor-driven products . . . improve the economy and productivity of your plant equipment. That's the horse-sense way to use horsepower.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



This VEGETABLE OIL COOLER fabricated by DOWNINGTOWN



has a cooling load of 8 tons refrigeration

The above pictured unit was *considered* and *approved* by the New York City Sanitary Department (with its rather strict requirements). It is now cooling 10 GPM of vegetable oil from 90° F. to 50° F. by means of Freon-12 boiling in the shell at a temperature of 40° F.; this is a cooling load of 8 tons refrigeration. Heads are swing-bolted for quick clean-out of tubes from either end. Tubes are ¾" diameter, steel.

We of DOWNINGTOWN are well prepared to design and build coolers of this nature . . . for other oils and other liquids, such as fruit juices, soups, extracts, etc. We will also build these coolers of Stainless Steel if the customer so desires. At present, our deliveries are good.

DOWNINGTOWN coolers use either Ammonia or Freon-12, in the shell, to cool vegetable oil in the tubes. The tube side is usually carbon steel, with ordinary tubes being utilized. Head construction varies in accordance with local Sanitary Departments requirements.

DOWNINGTOWN will fabricate these units to A.S.M.E. code, or to any other reasonable standards that may be required.

Our Engineering Consultation is at *your service* to aid you in preparation of plans and specifications for definite jobs.

DOWNINGTOWN IRON WORKS
DOWNINGTOWN, PA.
HEAT EXCHANGERS

of the finance committee. William F. Seals, Atlanta, was re-elected president. Vice-presidents re-elected included C. E. Johnson, Chicago, and J. D. Sargent, Granbury, Tex. C. L. Halladay, Chicago, was elected a vice-president to succeed H. G. Ritchey, Atlanta, district manager of Southern Cotton Oil Co.

Peach Crop Hurt

Availability of peaches in the Southeast will be limited due to the heavy frosts which, in some sections, reduced the crop to approximately 30 percent. South Carolina, particularly the Piedmont area, was hard hit. In Georgia, too, late frost killed many of the mountain varieties. Central Georgia is particularly spotty on crop yield with some orchards suffering 75 percent loss.

Schedule of Events

June

1-30 Dairy Month

5-10 National Confectioners' Association, 66th annual convention, and 23rd confectionery industries exposition, Stevens Hotel, Chicago.

6- 8 Grocery Manufacturers of America, mid-year meeting, Cavalier Hotel, Virginia Beach, Va.

6- 8 Oyster Institute of America, annual convention, Chamberlain Hotel, Old Point Comfort, Va.

7- American Association of Candy Technologists, Stevens Hotel, Chicago.

24- National Pickle Packers Association, mid-year meeting, Bismarck Hotel, Chicago.

27-28 National Macaroni Manufacturers Assn., 45th annual convention, Edgewater Beach Hotel, Chicago.

July

11-14 Institute of Food Technologists, 9th annual meeting, Civic Auditorium, San Francisco.

August

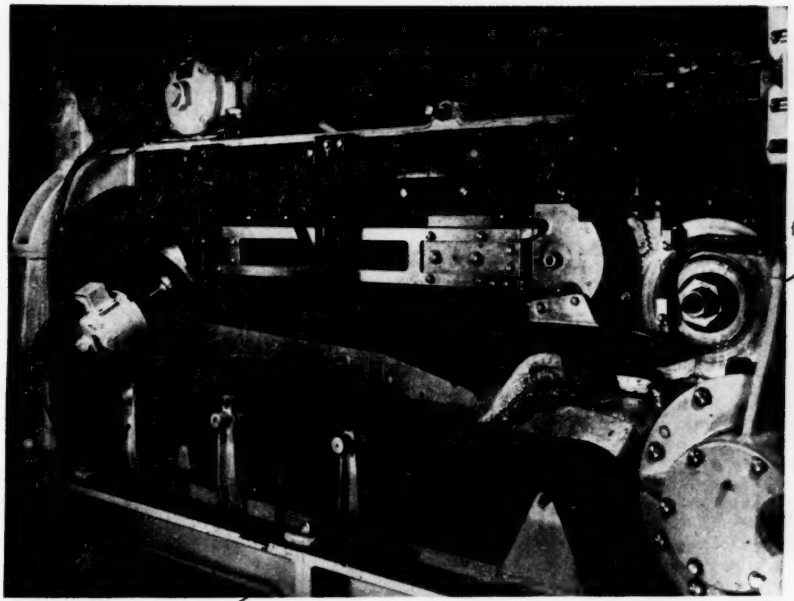
15-19 International Dairy Federation and Swedish Dairy Industry, 12th International Dairy Congress, House of Parliament and Concert Hall, Stockholm, Sweden.

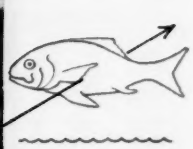
15-19 American Oil Chemists Society, University of Illinois, edible fats and oils short course, Urbana, Ill.

17-Sept. 6 United Nations, scientific conference on the conservation and utilization of resources—Aug. 18—Critical food shortages—Sept. 2—Development of fish resources processing—Lake Success, N. Y.

28-31 National Frozen Food Locker Assn., 10th annual meeting, Stevens Hotel, Chicago.

—*End*





Stainless Steel plays an important part in this automatic fish filleting machine — the key equipment for the continuous processing of cod, haddock, etc. It took nearly 20 years and cost almost $1,000,000 to perfect this machine for whose development the Atlantic Coast Fisheries Co. was last year given the first Award for Food Technology Achievement.

STAINLESS STEEL is a "natural"

for continuous processing equipment

● Continuous processing offers the food plant operator an effective means of offsetting the constantly rising cost of labor and materials.

Results already obtained in completely mechanized and streamlined plants clearly indicate that continuous processing not only ensures better quality control but materially lowers production costs. This is especially true when Stainless Steel is used generously in the equipment and machinery—for Stainless has exactly what it takes to make continuous processing really *continuous*.

Because it cleans so quickly and easily . . . because it is so much stronger and tougher than other materials . . . because it offers superior corrosion resistance and safely withstands extremes of heat and cold, Stainless Steel reduces production line interruptions and shutdowns to the very minimum.

Furthermore, because Stainless Steel is chemically inert in the presence of practically all food products and adds no metallic flavor or contamination to whatever food is in process, its use in continuous processing lines makes it possible to switch from one food to another with perfect safety and with least delay.

If you want the best results from continuous processing equipment make sure it is made of the finest Stainless Steel—U·S·S Stainless. For here is a complete family of *perfected*, special-purpose steels that will meet almost any requirement of food plant service. Our engineers are specialists in its use and will gladly assist you in selecting the proper type to ensure the greatest benefits from its application.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS • STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

S-1601

UNITED STATES STEEL

BACK IN THE 1880's

WHEN THE FIRST ELECTRIC ELEVATOR WAS INVENTED

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Design ingenuity and engineering skill are responsible for the swift pace of industry. And these are the very tools with which KOVEN has achieved the recognition of men in the food field by manufacturing individualized food equipment that creates more efficient, economical production. Our two vast plants can turn out exactly what you require to save money and time on any specific operation. Facilities include machine, welding, painting and galvanizing shops, all modern and completely equipped. X-ray inspection insures quality control.

Among the many KOVEN products in all commercial and non corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabricators; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals.

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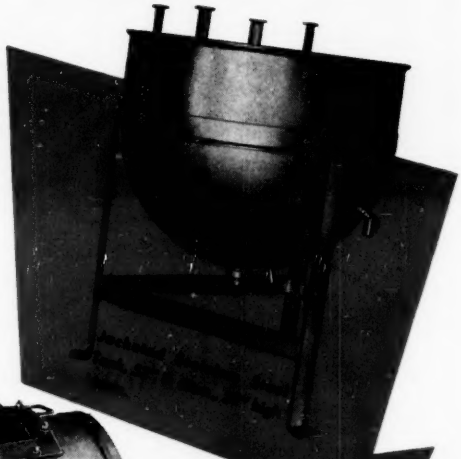
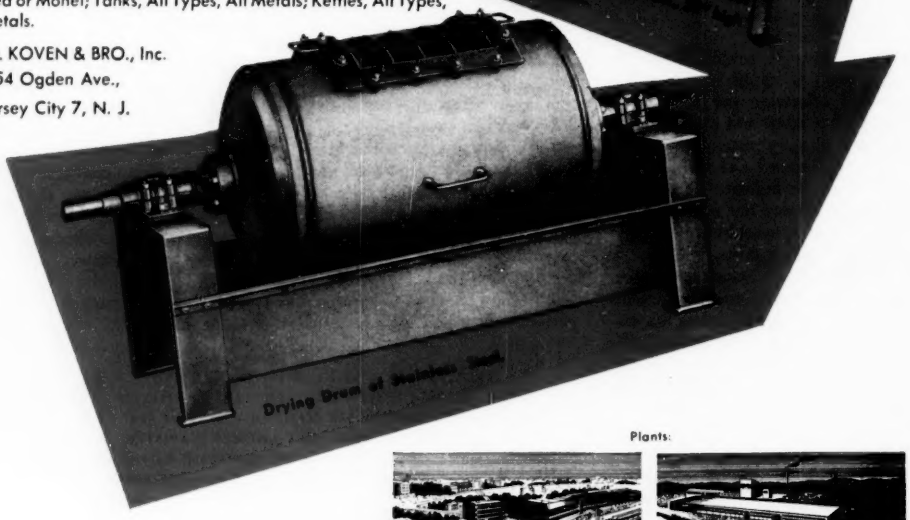




Plants:

Jersey City, N. J.

Dover, N. J.

KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881

Changes in Food Supplies

Production

CREAMERY BUTTER production in March was estimated at 112,025,000 lb., the highest March level since 1944. This was up 24 percent from March 1948 and was only a fraction under the five-year average for the month. The February-March advance, on a daily basis, is computed at 11 percent, compared with 5 percent a year ago, and 7 percent for the five year average.

AMERICAN CHEESE output for March, estimated at 71,275,000 lb., was 20 percent above February, 21 percent more than March 1948, and 14 percent higher than the recent five year average for the month. On a daily basis, however, the February-March advance was only 8 percent, compared with a 17-percent gain a year ago, and a five-year average upturn of 15 percent.

ICE CREAM production was estimated at 42,085,000 gal., 7 percent under March 1948, but 19 percent more than the recent five-year average for the month. This was the smallest March production since 1945.

Materials

PEPPER imports dropped to 29,400,000 lb. in 1948, compared with 39,900,000 lb. imported in 1947, and a prewar average of over 53,000,000 lb. Unsettled political conditions in Indonesia, which supplied about 95 percent of the U. S. pepper imports before the war, make it uncertain when pepper production will return to its prewar level.

TOMATOES for processing will cover 401,490 acres, according to manufacturers' reported intentions. This is about 15 percent under acreage plans for a year ago, but only 4 percent less than actual plantings in 1948.

BEETS for canning will be planted on 16,500 acres, according to intentions. This is 30 percent greater than intentions a year ago, and is 19 percent more than the 13,870 acres planted last year.

CABBAGE that kraut packers intend to contract for this year is 4 percent under the contract acreage in 1948, and 13 percent less than the ten-year average.

SNAP BEAN processors report intentions to plant 15 percent more acreage than was planted for canning and freezing last year. This would bring a harvest about equal to the ten-year average of approximately 180,000 tons.

SWEET CORN processors apparently intend to reduce acreage by about 2 percent. Intended plantings should yield about 1,128,900 tons, compared with 1948 production of 1,317,400 tons.

CUCUMBERS will utilize 142,080 acres, which is 4.6 percent greater than reported intentions a year ago, and 4 percent more than actual plantings in 1948.

Storage

FROZEN FISH AND SHELLFISH held in storage April 1, came to 83,632,069 lb., an increase over the 76,743,236 lb. held on the same date a year ago.

PUBLIC FREEZER SPACE was 64 percent occupied on April 1, which is the lowest for the date since 1943, and represents a 14-point decline from the five-year average.

COOLER SPACE was 48 percent filled on April 1, comparing with 59 percent a year ago, and 67 percent for the five-year, April 1 average.

Indexes

The commodity index for foods, compiled by the New York Journal of Commerce, stood at 182.6 for the week ending May 14, compared with 183.7 for the previous week, 181.6 for April and 202.7 for May, 1948.

BUSINESS WEEK's index of business activity declined to 190.3 for the week ending May 7, which compares with 191.0 for the previous week, 194.6 a month earlier, and 191.2 a year earlier.

CONSTRUCTION

	Pending (thousands)	Awarded May (thousands)	Total Awarded 1949 (thousands)
Bakery	$743	.....	$2,775
Beverages	543	$544	7,943
Canning and Preserving	.....	.....	115
Cold Storage	.....	.....	1,677
Confectionery	68	.....	700
Grain Mill Products	1,438	865	4,164
Ice, Manufactured	.....	.....	.....
Meats and Meat Products	1,200	110	6,726
Milk Products	618	100	1,825
Miscellaneous	70	2,200	8,050
	$4,680	$3,819	$33,975

Low Cost Fortifiers Help Meet Tougher Competition!

ONE added low cost nutritional fortifier can spark advertising and sales . . . provide fresh appeals to consumers . . . put you far ahead of your competitors!

One of our technical men will be pleased to consult with you. No obligation! Special Products Division, STANDARD BRANDS INCORPORATED, New York 22, N. Y.

VITAMIN D PRODUCTS: Hy-Dee Irradiated Dry Yeast, Irradiated Dry Yeast Type 700-H, Viosterol (Irradiated Ergosterol).

NATURAL B-COMPLEX PRODUCTS: Pure Primary Dry Yeast (brewers' type), Bee-Flex Products, Yeast Extracts, Yeast Extract and Liver, Fortified Yeast with Iron.

Fleischmann's

"First For Food Fortification"

CASE HISTORY #3

The.....Co., nationally known food manufacturers, phoned Edlaw: Have Export Order for one million Cans Soup Mix—Deadline shipping date—Hot weather stopped our packaging line!

Have you air-conditioned plant? High speed filling equipment? Automatic can closing? Labeling machine? Can you take over this order and deliver on time? Will costs be in line?

All questions answered "yes"! Bulk material and supplies were started in—and finished cases were rolling out—on schedule—as promised!

Memo to Contact The Edlaw Co.

Contract Packaging AT PRE-DETERMINED COST

88-61 76th AVENUE GLENDALE, L. I., N. Y.

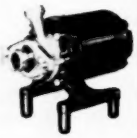
DO YOU KNOW?

CP Boosters and complete refrigeration equipment for foods, beverages. 2, 4 and 6 cylinder CP Ammonia Compressors.

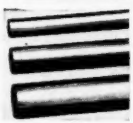
CP Multi-Flo Homogenizer with Single Service Valve does a better job of homogenization with less pressure and horsepower. Minimum clean-up time.

CP Stainless Steel Multi-Pass Plate Heat Exchanger. Can be used for heating or cooling milk and many other liquid products, or as a High Temperature Short Time Pasteurizer.

CP Stainless Steel Multi-Process Tanks are ideal for pasteurizing and mixing milk, cream, and other liquid food products. Vapor or Film Heating.



CP Stainless Steel Pumps assure sanitation standards. Ideal for pumping a wide variety of liquid food products.



CP Stainless Steel Fittings and Tubing available from warehouse stocks coast to coast.

See Classified Directory for Phone Number of the nearest CP Branch listed below.

THE *Creamery Package* MFG. COMPANY

General and Export Offices

1243 W. Washington Blvd., Chicago 7, Illinois

BRANCHES: Atlanta • Boston • Buffalo • Chicago • Dallas • Denver • Houston • Kansas City, Mo. • Los Angeles • Minneapolis • Nashville • New York • Omaha • Philadelphia • Portland, Ore. • Salt Lake City • San Francisco • St. Louis • Seattle • Toledo • Waterloo, Ia.

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

What Washington Thinks

By R. S. McBride, Washington, D. C.

NEW FARM POLICY—Adoption of guaranteed income arrangements for farmers, the popular meaning of the new farm policy proposed by Secretary of Agriculture Brannan, is a fine target for criticisms of the Administration. Complete acceptance soon by Congress would surprise everyone, including the Secretary. But it shows the trend in thinking of many members of the Administration.

SPEEDY CHURNING—Enthusiastic claims are made for a rapid churning cycle of the Fritz process described in a report of Office of Technical Services. This cycle churns in half a second "instead of the 40 minutes required in conventional equipment." The butter has a structure different from that of ordinary butter, but with proper production precautions is high quality with good keeping characteristics and a very pleasing flavor, so foreign experience indicates. Most significant for the plant man is the advantage claimed in low investment cost, low power and labor requirement, and small space needed for high capacity equipment.

WHEAT AGREEMENT—Very complete statistical support is given by the Department of Agriculture in advocating Congressional approval for the International Wheat Agreement. Secretary Brannan reports that failure of the previous Congress to approve such a pact has mainly changed the range of prices guaranteed, slightly to the disadvantage of American wheat growers. Favorable Congressional action is generally forecast about Washington.

NEW LABELS—Food plant operators using DDT compounds can expect to find new precautionary information on the packages soon. Inevitable are the restrictions on the use of this insecticide anywhere that might possibly result in even extremely small contamination of foodstuffs. Spray schedules, previously carefully planned, require reappraisal in view of the more rigorous supervision of insecticide use contemplated by Food & Drug Administration and Public Health Service.

IN THE ORIENT—China is a strategic morass. Civilian and international fighting has been going on there almost continuously for 40 years. Official Washington is terribly disappointed, but not surprised, at the recent collapse of the Nationalist effort. The early military implications are generally judged to be small as affecting United States activity. The result may be mainly a strengthening of our defense program with the money that otherwise might have given some measure of aid to the Chinese people. Chinese relief with food or other materials has now necessarily become a negligible part of Uncle Sam's Oriental activity.

FOR ADVERTISING—Plant locations are selected for a number of reasons. Of late, the publicity value of a location has been given more and more consideration. This has gone so far that in a recent government document discussing location for milk-products plants, one of the ten numbered items was "advertising possibilities." Factory superintendents and foremen must remember also that the condition of a plant as well as its location contributes to public reaction toward the company business.

PLANT LOCATION—The complete list of "principal points to bear in mind in locating a milk-products plant" given by Uncle Sam's experts is: (1) Ease of access from as many sides as possible; (2) value of property; (3) cost of getting milk to the plant; (4) proximity to distribution center; (5) advertising possibilities; (6) opportunity for retail-counter cash trade; (7) nearness to city water supply, sewage connections, and electric power; (8) avoidance of heavy traffic surroundings; (9) good drainage, and (10) pure air and clean surroundings.

SOCIAL SECURITY—Official Washington is supposed to carry out some of President Truman's pre-election promises by broadening Social Security and providing some kind of improved public health and medical service. The clamor against "socialized medicine" is going to make the latter part of this program difficult of Congressional enactment. The groans of taxpayers are loud enough also to drown out many of the new Social Security proposals. Almost certain, is some increase next year in the deductions and the employers' tax to provide higher Social Security payments. Also rather expected in Washington is broadening of Social Security somewhat. The food industry will

be most significantly affected should the area of Social Security taxation extend to some first processor plants now exempted as agricultural employment.

"X NUTRIENT" IDENTIFIED—A number of years ago, Bureau of Dairy Industry chemists identified a "Nutrient X," which was essential for growth, development and normal living of certain experimental animals. This material, then unknown as to chemical nature, is now identified by the Bureau as vitamin B_{12}. Samples of crystalline B_{12}, available commercially, have been proved to have the same dietetic effects in rat feeding as Nutrient X. Most important function appears to be the assistance of the animal in utilizing proteins of the diet. In the absence of this vitamin, high level protein feeds are wasted, or become dietetic burdens on the animal.

SELLING NEW PRODUCTS—The Department of Agriculture comes out with a very blunt warning to farmers on the question of developing markets for new farm products. Says the Department—

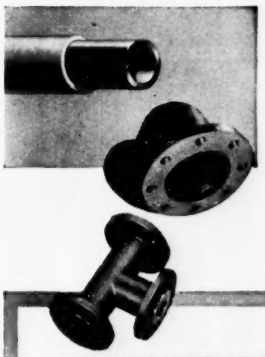
"The basic issue seems to be: Who is to assume the responsibility and the cost of creating a market for a new product? A logical answer would be that the responsibility and cost should rest with those who will benefit financially from the program."

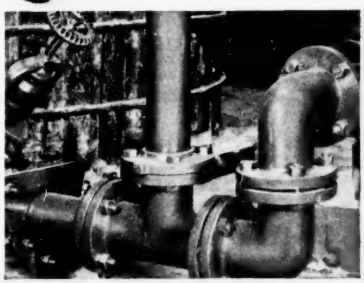
Apparently, some farmers have felt that Uncle Sam, or industry, or somebody, ought to do their market development for them. We suspect that a great many food company sales managers would welcome such an arrangement, too, if they could avoid the expense of new market exploitation. No chance!

"27 PERCENT WASTED"—Government studies show that 27 percent of tomatoes picked are wasted by decay, cracking, insect damage, and other causes during ripening and repacking for the fresh market. No wonder the farmer gets only 31¢ out of the retail tomato dollar. We doubt whether anyone could stay in the tomato processing business if he could not utilize a higher percentage of his purchase. All of this shows why processed food has an economic advantage in the market basket competition.

FARM LAND VALUES—The declining market for agricultural products, particularly grains, has already been reflected in a shrinking in farm real estate values. During the first four months of this year, farm land prices showed a decline for the first time in ten years.

saran lined steel pipe





resists corrosion

- reduces shut-downs and lost production!
- saves time and labor!
- readily field-fabricated!

The conveyance of corrosive liquids can prove as hard on profits as it is on equipment. Saran Lined Steel Pipe is designed and constructed to protect YOUR profits. It combines the desirable features of steel pipe—rigidity and pressure strength—with Saran's unusual resistance to most corrosive chemicals, solvents, and erosion. Another advantage is ease of field fabrication. For general service, Saran Lined Steel Pipe can be used at temperatures between —40° and 190°F.

Saran Lined Steel Pipe comes in maximum lengths of 10 feet and in sizes from 1 to 4 inches. Plug valves and fittings, also Saran Lined, include elbows, tees, companion and reducing flanges, and gaskets. AVAILABLE IMMEDIATELY. Write us today for further information concerning Saran Lined Steel Pipe and how it can solve your problem. Manufactured by The Dow Chemical Company, distributed nationally by Saran Lined Pipe Company.

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DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

Longer Shelf Life for Lard and Baked Goods!

Tenox II

New Stabilizer for Retarding Oxidative Rancidity in Lard

Tenox II imparts longer shelf life to lard—and also to baked goods, packaged pre-mixes, prepared foods, and other products made from lard. It is the only antioxidant with substantial carry-through properties under baking temperatures to combat rancidity in baked goods.

Tenox II is especially formulated for convenient, economical processing. It is added to the lard after rendering in the usual way. Its cost is only a few cents per hundredweight of lard. One pound of Tenox II is sufficient to stabilize 2,000 pounds of lard.

Write for complete information about this important food saver.

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West Coast:
Wilson & Geo. Meyer & Co.

SAN FRANCISCO:
333 Montgomery St.

LOS ANGELES:
816 W. 5th St.

PORTLAND:
520 S. W. 6th Ave.

SEATTLE:
1020 4th Ave., So.

TENNESSEE EASTMAN CORPORATION

(Subsidiary of Eastman Kodak Company) • KINGSPORT, TENNESSEE

Men, Jobs, Companies

MILO E. MOORE, former Washington state fisheries director, has been appointed fish processing specialist to Greece for ECA. He will study and recommend practical methods for increasing country's fish production.

VICTOR L. JOHNSON is now vice-president of American Sugar Refining Co., New York, in charge of refinery operations. He joined company in 1937 as a member of its student training program.

SAMUEL ZEMURRAY, the chairman of executive committee of United Fruit Co. during past year, has been re-elected to his former post as firm president. He succeed T. D. Cabot, now an executive board member.

EDWARD S. MOORE, JR., has been elected executive vice-president of National Biscuit Co., New York. Before this promotion, he had been vice-president and also assistant to president of the firm, George H. Coppers.

Industry

Alberta Salt Co., financed by Anglo-Canadian Oil, Calgary & Edmonton Corp., and Home Oil, recently opened its new $1,000,000 salt plant at Lindbergh, 160 miles northeast of Edmonton, Alberta, Canada.

American Institute of Baking, Chicago, announces plans for erecting a headquarters building at the northeast corner of Ontario St. and McClurg Ct., Chicago. Estimated cost is $500,000.

Arnold Bakers, Inc., of Port Chester, N. Y., announces that J. D. Calhoun, and G. G. Black have been elected vice-presidents. E. J. Kowaleyk has been promoted to production manager.

Atlanta Coca-Cola Bottling Co., Atlanta, Ga., has awarded a contract for construction of a $100,000 addition to its present plant.

Borden Co. has purchased the million-dollar plant of Storkline Furniture Corp., Chicago, and will transfer all activities of its Chicago Ice Cream Division to the new location.

Bloomsburg Cooperative Canners, Inc., Bloomsburg, Pa., has purchased the plant and facilities formerly owned and operated by Cooperative G.L.F. Exchange, Inc., of Ithaca, N. Y.

Coca-Cola Bottling Co. of N. Y. has deferred plans to erect three new plants in New Jersey and New York. J. T. Murray, firm president, stated that rising costs and taxes prevented further expansion.

Canada Dry Bottling Co. recently held a formal opening of its new $175,000 plant at Asheville, N. C.

Felber Biscuit Co., Columbus, Ohio, has started construction of a three-story addition to its present plant. The improvement is expected to cost $300,000 and provide about 30,000 sq. ft. of extra floor space.

Forsyth Royal Crown Bottling Co., Winston-Salem, N. C., has been incorporated to bottle soft drinks. Authorized capital stock is $100,000.

Givaudan-Delawanna, Inc., New York City, manufacturer of aromatic materials, announces formation of a new corporation, Givaudan Flavors, Inc., which will be devoted exclusively to production and sales of flavors.

Granite Bottling Works, Inc., Granite Falls, N. C., has been organized to deal in carbonated beverages. Authorized capital stock is $100,000.

Kraft Foods Co. is planning construction of a modern cheddar cheese factory at Fayetteville, Tenn. It will be equipped to handle more than 200,000 lb. of milk daily.

Libby, McNeill & Libby has leased and will operate the Klawock, Alaska, salmon cannery of Demmert Packing Co. Libby is adjusting its Alaskan program to new territorial regulations covering fishing and taxation.

National Committee of Food Sanitarians has elected E. L. Holmes of the American Institute of Baking as its president, Don King of Bowman Dairy Co. as vice-president, and J. P. Barrett of Armour and Company as secretary.

Pepsi-Cola Bottling Co., New Orleans, has purchased a $95,000 industrial site for construction of a modern bottling plant.

Rowena Mills, Inc., Portland, Mich., has been incorporated for $300,000 by Valley City Milling Co., also of Portland.

Sun Dine Co., Florida citrus canner, is expanding operations with the addition of beans, tomatoes, and other vegetables to its line.

Standard Brands, Ltd., Montreal, Canada, is building an addition to its Ingersoll Cheese Co. plant.

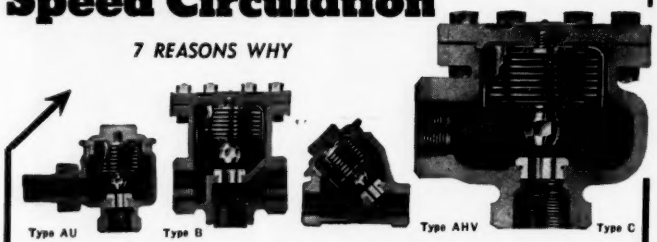
Swift & Co., Chicago, has abandoned plans to build a $1,000,000 ice cream plant in Grand Rapids, Mich. The plant site is now listed for sale.

Fire Losses: Main building of Denton Peanut Co., Denton, Tex., was swept by fire Mar. 2 with damages estimated about $40,000 . . . Plant of Griffin Baking Co., Greensboro, N. C., was destroyed Mar. 20 with a loss put at $50,000 . . . Warehouse of Southern Cotton Oil Co., Decatur, Ga., was

(Men, Jobs, Companies Continued)

Nicholson Steam Traps Speed Circulation

7 REASONS WHY



1. **BIG DISCHARGE.** 2 to 6 times average traps.
2. **NO AIR-BINDING.** Discharge both air and water.
3. **NO FREEZE-UPS.** Drain completely when cold.
4. **NO DRIBBLING.** Close tight when steam is in trap.
5. **NO ADJUSTMENT** needed for varying pressures.
6. **NO WATER-LOGGING.** Operate on lowest temperature diffential, 5° to 15°, depending on trap size and steam pressure.
7. **LOWEST STEAM WASTE.** As little as 1%.

HIGH-PRESSURE FLOATS — Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery. BULLETIN 348.

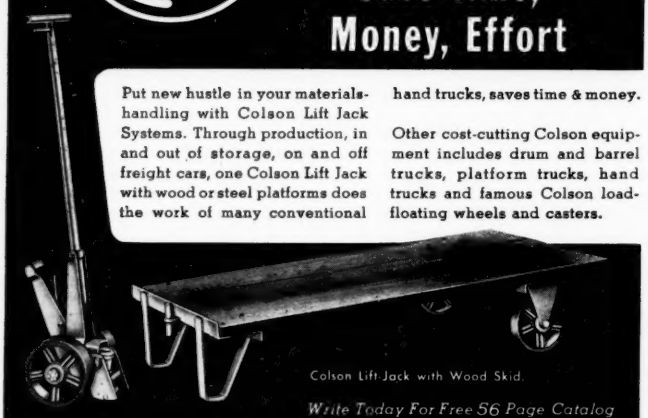
5 TYPES for every application. Sizes ½" to 2"; press. to 225 lbs. BULLETIN 1047

W. H. NICHOLSON & CO.
193 OREGON ST., WILKES-BARRE, PA.

Colson **LIFT-JACK Systems Save Time, Money, Effort**

Put new hustle in your materials-handling with Colson Lift Jack Systems. Through production, in and out of storage, on and off freight cars, one Colson Lift Jack with wood or steel platforms does the work of many conventional hand trucks, saves time & money.

Other cost-cutting Colson equipment includes drum and barrel trucks, platform trucks, hand trucks and famous Colson load-floating wheels and casters.



Colson Lift-Jack with Wood Skid.

Write Today For Free 56 Page Catalog

THE COLSON CORPORATION
ELYRIA, OHIO
CASTERS • • LIFT JACK SYSTEMS • • INDUSTRIAL TRUCKS

L. RUSSELL COOK has returned to Wilbur-Suchard Chocolate Co., Inc., Lititz, Pa., as vice-president. Since graduation from Pennsylvania State College in 1933, he has been associated with Wilbur-Suchard as chief chemist and later production manager. He has also been with Ludens, Inc., of Reading, Pa. as chief chemist, and with W. A. Cleary Corp., New Brunswick, N. J., as a vice-president.

ruined Mar. 16, with loss estimated to be $150,000 . . . The Honnegger Feed Mill, Fairbury, Ill., was destroyed Mar. 2, with loss calculated at $175,000 . . . Calif. Calavo Growers' avocado packing plant (reportedly the nation's largest), Vista, Calif., was destroyed by a $200,000 fire April 15.

Tornado Losses: Plants of Sullivan Packing Co. and Esco Products, both of Zebulon, Ga., suffered heavy damages from a tornado in April.

Personnel

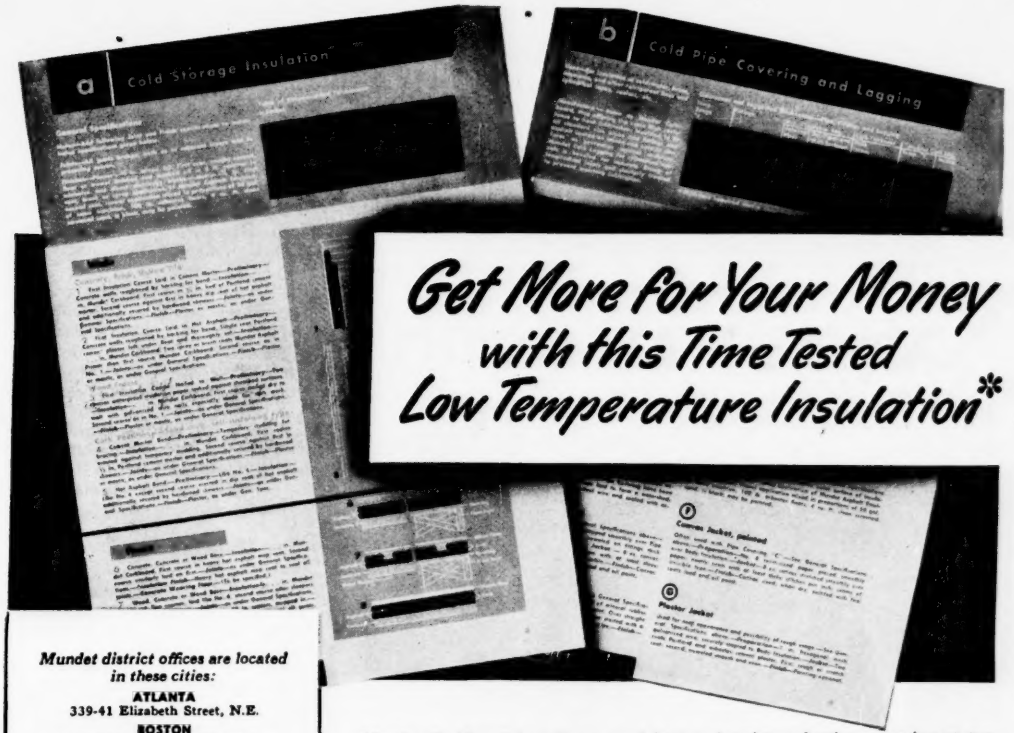
George B. Beitzel has been elected president of Pennsylvania Salt Mfg. Co., Philadelphia.

Willard P. Brown, Jr., formerly assistant to production manager of Maxwell House Division, General Foods, has been appointed assistant to director of advertising for the corporation.

Everett E. Haskell, former field man in procurement department of Beatrice Foods Co., Chicago, has been elected a vice-president of firm. He will be in charge of cream procurement and butter manufacturing operations.

Robert P. Mears has been appointed manager of new milk plant of General Foods Corp.'s Northland Dairy Divi-

(Men, Jobs, Companies Continued)



Get More for Your Money with this Time Tested Low Temperature Insulation*

Mundet Corkboard is a time-proved heat and moisture barrier . . . serving at top-efficiency in hundreds of quick freezing and frozen food locker plants, in cold storage rooms and food processing plants. Whether you have small or large facilities for low temperature, you need Mundet Corkboard for these dollar-saving advantages:

LOW CONDUCTIVITY Mundet Corkboard provides the most efficient barrier to heat transfer due to its internal cellular structure of sealed dead-air spaces.

STRUCTURAL STABILITY The cellular structure of Mundet Corkboard maintains its shape and characteristics under rigorous conditions of service.

NON-ABSORBENCE Mundet Corkboard has no capillary attraction. This nature-made quality avoids absorption of dampness and odors. There is no swelling or loss of insulating value from moisture infiltration.

EASE OF INSTALLATION Mundet Corkboard is light in weight despite its strength. It cuts easily, readily holds nails or skewers; bonds with cement, asphalt or paint.

LONG-LIFE There is only one way to figure insulation cost. That is the over-all 'life-expectancy' of the material. Here, again, Corkboard is the choice, with thousands of installations to prove its durable service.

The best insulation requires competent installation. You benefit from the experienced erecting services that are offered by Mundet branch offices. Corkboard is available for prompt shipment from nearby warehouses. Send coupon for copy of Mundet Cork Manual. Prepared in convenient filing size, with cork specification data.

F6

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Insulation Division
7101 Tonnelle Ave., North Bergen, N. J.

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Company.....

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CINCINNATI 2
427 West 4th Street
DALLAS 10
601 Second Ave.
DETROIT 21
14401 Prairie Street
HOUSTON 1
Commerce and Palmer Streets
INDIANAPOLIS
15 E. Washington St.
JACKSONVILLE 6, FLA.
800 E. Bay St.
KANSAS CITY 7, MO.
1428 St. Louis Avenue
LOS ANGELES
(Maywood)
6116 Walker Avenue
NEW ORLEANS 16
315-25 N. Front Street
PHILADELPHIA 39
856 N. 48th Street
ST. LOUIS 4
2415 South Third Street
SAN FRANCISCO 7
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Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

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for • SPRAYING • WASHING • RINSING • COOLING • AIR CONDITIONING

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for Bulletin N-616.

YARWAY SPRAY NOZZLES

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

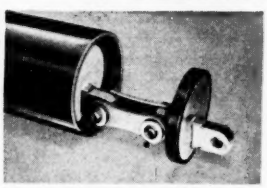
HAPMAN

SEALED-PIN, RUBBER-FLIGHT CHAIN CONVEYORS

FOR FLOWABLE MATERIALS

You can handle any type of *FLOWABLE* material at low cost per cubic foot with HAPMAN Conveyors. They have operated successfully for years and their versatility has been proven in handling all kinds of loose products from ground coffee and diatomaceous earth to crushed fish and ammonium sulphate.

If you now convey, elevate or otherwise move *FLOWABLE* materials, you should have our catalog on hand.



Each flight of this sealed-pin, solid link, conveyor chain consists of a layer of abrasive resisting rubber, bonded between 2 steel plates giving a rigid sanitary surface.

HAPMAN CONVEYORS, Inc. 2405 W. McNichols Rd. Detroit 21, Michigan

sion at Evart, Mich. He will be in charge of production of dried milk for use in milk chocolate at Walter Baker plant, Dorchester, Mass.

Herbert L. Roszell, Jr., who has been associated with J. D. Roszell Co., Peoria, Ill., and Beatrice Foods Co., Chicago, is now food technician with A. E. Staley Mfg. Co., Decatur, Ill.

Dr. Ira A. Gould, former professor of dairy manufacturing at U. of Maryland, has accepted appointment as chairman of the department of dairy technology at Ohio State University. He succeeds the late Robert B. Stoltz.

W. W. Paddon has been promoted from manager of general manufacturing department for Sunshine Biscuits, Inc., to vice-president in charge of manufacturing.

William F. Schmitt has retired as president of the Borden Co.'s Schmitt Brothers Division, Richland Center, Wis. He will be succeeded by John F. Meister, who has been the division's executive vice-president.

Dr. Walter M. Urbain, head of division of physics and physical chemistry at Swift & Co.'s research laboratories, has been elected chairman of Chicago section of ACS for 1949–50.

Marvin H. Walker, general manager of Florida Citrus Commission, Lakeland, announces that he will resign June 30.

Frank Whitmer, for the past eight years vice-president of Mrs. Stevens Candy Shops, Chicago, has been appointed general manager and vice-president for King Coles Candies, Inc.

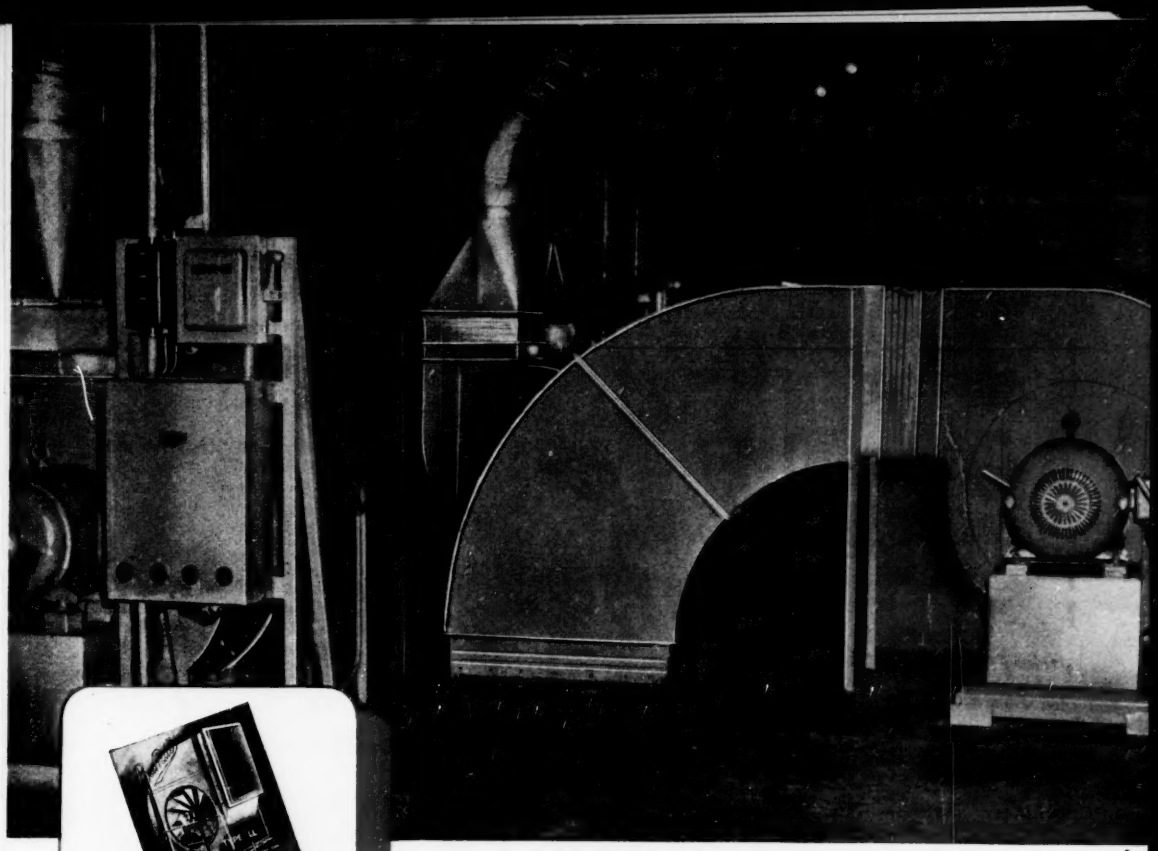
Raymond J. Wise of Chicago, supervisor of National Dairy Products Corp.'s midwestern milk and ice cream operations, has been elected a company vice-president.

Associated Industry

American Can Co. board of directors has elected Dudley W. Feggis chairman of board following retirement of Maurice J. Sullivan as chief executive officer. Carl H. Black was elected president.

Cochrane Corp., Philadelphia, has purchased all capital stock of Liquid Conditioning Corp., Linden, N. J.

(Men, Jobs, Companies Continued)



FREE FACTS! Yours for the writing, Bulletin 3675, above, gives all engineering data on "Buffalo" Limit-Load Fans. Shows the remarkable range of sizes and arrangements to suit your particular application for low-cost air. Write now!

Supplying FAR MORE *than* ECONOMICAL FRESH AIR—

What is dependable air moving service worth to YOUR PLANT? A great deal, when it means adequate fresh air that makes employees more productive — when it means thorough fume or moisture removal for better quality control and increased plant safety! It can mean A BETTER PRODUCT AND MORE OF IT!

"Buffalo" Limit-Load Fans can give YOU these very real benefits. They are doing it for thousands of chemical and processing plants. And they are doing it to complete satisfaction in on-the-job performance and "cost per CFM".

Here's quiet, smooth, TROUBLE-FREE air service! Specially shaped housings scroll and double curved blades — dynamic wheel balance — slow speed operation — all mean "extra" performance that pays for itself year after year. "LL" fans are non-over-loading, and may be had in almost the exact size you need — assurance of ENOUGH air at the lowest possible power cost. Why not let your trained "Buffalo" representative show you the EFFICIENCY jobs these fans can do for you?

A "MUST" FOR EVERY ENGINEER!

FAN ENGINEERING, 5th Edition, gives you a wealth of practical straight-to-the-point answers on practically every air problem. Pocket size. Result of 70 years of fan experience. Order now! Postpaid $6.00.

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Canadian Blower & Forge Co., Ltd., Kitchener, Ont., Branch Offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

This Crescent.....

raises profits for M & R

With the reach of a giant, the Crescent Electric PALLETIER finds extra storage space way up at the ceiling in the M & R Dietetic Laboratories, Columbus, Ohio. It lifts. It hauls. It tiers. It does the whole handling job with just one operator. The PALLETIER picks up profits by lowering handling costs.

The Crescent PALLETIER is packed with power for repeated stop and go handling. It scoots up and down plant aisles, in and out of narrow areas, steps up handling everywhere from receiving to shipping.

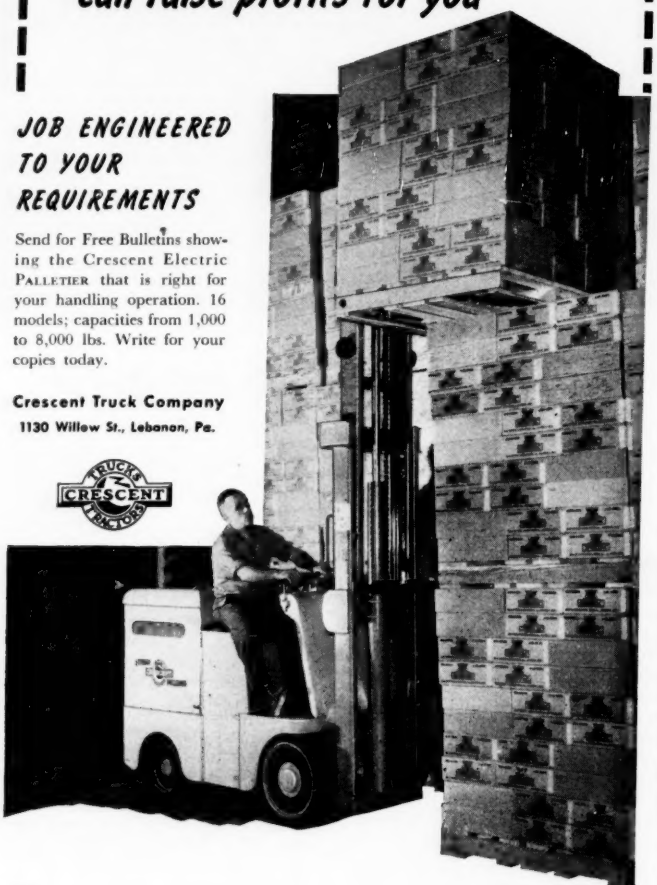
A Crescent

can raise profits for you

JOB ENGINEERED TO YOUR REQUIREMENTS

Send for Free Bulletins showing the Crescent Electric PALLETIER that is right for your handling operation. 16 models; capacities from 1,000 to 8,000 lbs. Write for your copies today.

Crescent Truck Company
1130 Willow St., Lebanon, Pa.



Crescent ELECTRIC INDUSTRIAL TRUCK AND TRACTOR SPECIALISTS SINCE 1917

and welding and process equipment sales in the Pittsburgh district.

Main Belting Co., Philadelphia, announces the election of H. Paul Grant as chairman of board and R. C. Disnery as board member and vice-president in charge of sales.

Package Machinery Co. reports that Roe Clark, chairman of executive committee and treasurer of firm, is traveling in England, France, Italy, and Switzerland to study procedures in machinery-making field.

Robert E. Savage, formerly president of Savage Bros. Co., Chicago, has formed another company to offer a complete line of equipment and engineering service for manufacturing confectioners.

Specialized Instruments Corp., Belmont, Calif., announces appointment of K. Kennard Gross as eastern service engineer for Spinco Ultracentrifuges, with headquarters in Philadelphia.

Deaths

Vladimir Azaroff, self-exiled Russian scientist, who had been working on a process for making a nutritious fruit bread from waste citrus pulp—in Jacksonville, Fla., Apr. 26.

William R. Drynan, 81, president of Canadian Canners, Ltd.—at his home, Hamilton, Ontario, Apr. 13.

D. R. Howland, 58, president of packing firm of Miller & Hart, Inc., Chicago—while vacationing in Florida, Apr. 4.

Rudolph H. Kuehmann, 53, chairman of board and treasurer of Kuehmann Potato Chip Co., Toledo, Ohio—unexpectedly of a heart attack while vacationing at Fort Lauderdale, Fla., Mar. 31.

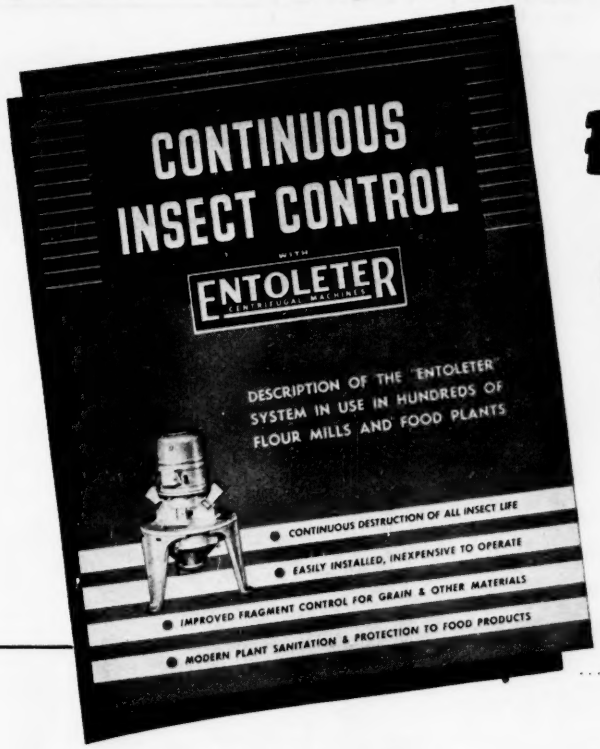
Louis H. Risser, 68, president of Milford Canning Co., Milford, Ill.—in a Chicago hospital, Apr. 2.

George J. Schultz, 79, for 24 years head of Schultz Sausage & Provision Co., Chicago—in Wesley Memorial Hospital, Chicago, Apr. 13.

William A. Upham, owner of Upham Food Co., Hawleyville, Conn., and reportedly the originator of the commercial tea ball—April 19.

—*End*

KEEP YOUR FOOD PRODUCTS


CONTINUOUS
INSECT CONTROL
WITH
ENTOLETER
CENTRIFUGAL MACHINES
DESCRIPTION OF THE "ENTOLETER" SYSTEM IN USE IN HUNDREDS OF FLOUR MILLS AND FOOD PLANTS
● CONTINUOUS DESTRUCTION OF ALL INSECT LIFE
● EASILY INSTALLED, INEXPENSIVE TO OPERATE
● IMPROVED FRAGMENT CONTROL FOR GRAIN & OTHER MATERIALS
● MODERN PLANT SANITATION & PROTECTION TO FOOD PRODUCTS

FREE OF INSECT LIFE

. . . illustrated bulletin sent on request.

BUG-LIFE doesn't have a chance to spoil food products when "ENTOLETER" Continuous Insect Control is installed in mills and food plants. With this tested and proved protection, you benefit 3-ways:

- SAFEGUARD YOUR PRODUCTS FROM BUGS & FRAGMENTS
- EXTEND YOUR SELLING SEASON WITHOUT FEAR OF "TURN-BACKS" OR SEIZURES
- ENJOY THE PROFITS IN SUMMER SALES

Operating records show that "ENTOLETER" Control destroys insect life in all its forms, in flour, meal, mixes, cereals, powdered soups and similar free-flowing dry materials. In addition to its primary function of insect control, the "ENTOLETER" system is an excellent means of blending flours, mixing compounds and improving vitamin distribution. It is wholly mechanical; uses no heat, gas or chemicals, and does not change moisture content of "ENTOLETER" products. The system is easy to install; simple to operate and maintain. Send coupon now for full information on "ENTOLETER" Control. We shall be glad to show how it can be applied to your products.

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CENTRIFUGAL MACHINES

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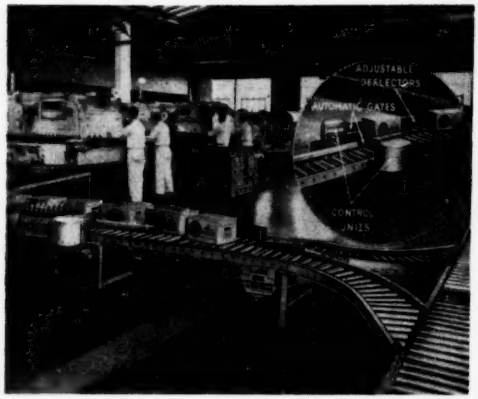
Food Equipment News



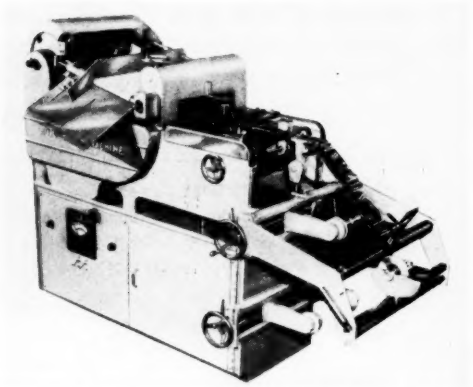
Traffic On Conveyor Lines Is Automatically Merged

Flow of cartons, cases and packages can now be automatically merged and directed to either left or right along a single conveyor line by means of a recently developed system named MergA-Flow.

Principle and operation are simple. When one of the electrically interlocked gates of unit is held open by flow of cartons or cases, other gate blocks flow on second line.

A "break" in flow of cartons on first line automatically closes first gate and opens gate on second line. This allows cartons on second line to flow until a "break" in flow on second line occurs. Gate No. 2 automatically closes and Gate No. 1 opens again.

The adjustable deflector, adjacent to the gates, automatically directs cartons, cases or packages from either line in pre-determined direction along a single conveyor line to other departments.—*The Alvey-Ferguson Co., Cincinnati 9, Ohio.*



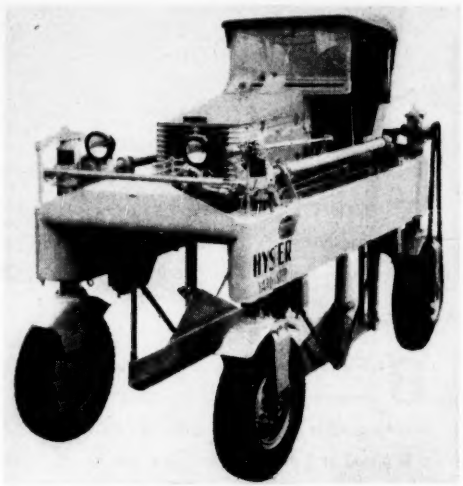
Silicone Rubber Eliminates Sticking in Bag Machine

Most heat-sealable materials can be used in a new machine capable of making 120 double sealed bags per min.

General Electric's silicone rubber has been adapted for the heat-sealing operation. Sticking of heat-sealable materials to the pressure pads has always been a grievous problem for manufacturers of heat-sealing bag machines. This condition has been definitely eliminated.

Most outstanding characteristic of silicone rubber is its high heat resistance. Exposure to temperatures of 300 to 400 deg. F. in the sealing operation does not increase the surface hardness of silicone rubber at all, and decreases its flexibility and resiliency only negligibly. Silicone rubber neither softens nor becomes sticky, nor does it adhere to cellophane, metal foil or other bag materials.

The machine can make double sealed bags in flat, gusset, single-wall or duplex types. Size ranges are 2 to 9½ in. wide and 3 to 16 in. long with change-over time from one bag size to another only a matter of minutes.—*Roto Bag Machine Corp., New York City.*



Straddle Truck Capacity Upped

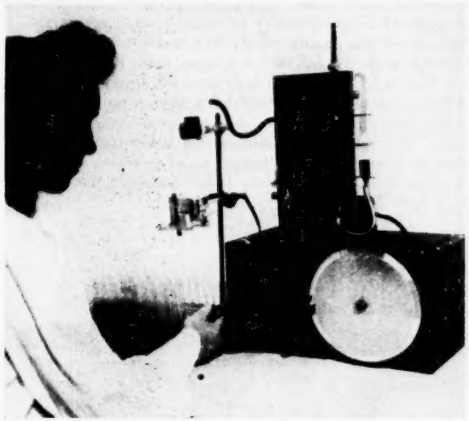
Improved Model "M" straddle truck of 18,000 lb. capacity replaces a 12,000-lb. capacity unit. The new machine nevertheless is not larger in size, but because of a revised main frame structure and a new hoist clutch arrangement is capable of carrying the heavier load. Greater visibility from the driver's seat has been attained by use of a forward sloping hood.

One of the main features of the new model is its spring suspension system. This is designed to give better riding and steering and more traction for driving wheels. It is stated to reduce frame stress and tire wear, while facilitating travel over slippery or rough road surfaces.

Operating on pneumatic tires and having four wheel hydraulic brakes, the truck is powered by a six cylinder 82 hp. engine having four speeds forward and back. It may be geared for speeds of from 30 to 45 mph., according to requirements. Without a load, the straddle truck has an average turning radius on level ground of 12½ ft. A positive acting automatic stop prevents over-run of the hoisting and lowering mechanism.

The standard model is equipped with mechanical swinging shoe control. However, vacuum and automatic con-

trols are available as optional equipment to suit conditions of operation.—*Hyster Co., Portland 8, Ore.*



Automatic Dispenser-Titrator Saves Time, Labor

This instrument was developed for measuring fluids in connection with microbiological assays for amino acids and vitamins, but since its original conception several new applications have been suggested.

It is so designed that it will replace with equal facility pipettes for the measurement of volumes or a burette for the titration of samples. Taking the place of slow and tedious hand pipetting, it measures individual or series of graded volumes at the rate of 40 per min. with reproducibility of ±1 percent.

Drainage errors and the fatigue and eyestrain involved in manipulating and reading a meniscus are eliminated. Combined with suitable end-point sensing equipment, titration becomes entirely automatic and independent of the skill or judgment of the operator.

An experienced technician can handle 1000 to 1500 titrations a day requiring 5 to 10 ml. of reagent measured to an accuracy of ±.05 ml.

The instrument utilizes the principle that the volume of liquid delivered from an orifice is proportional to the length of time it is allowed to flow, other factors remaining constant. It comprises four units: Pressure regulator, valve, timer and footswitch.—*International Instrument Co., 729 S. Harvard Blvd., Los Angeles 5.*

Boiler Feed-Water Control

A new principle of boiler feed-water control uses the weight of water as a force to motivate the feed-water valve. Since no heat is required to operate it, heat and cold have no effect on its performance.

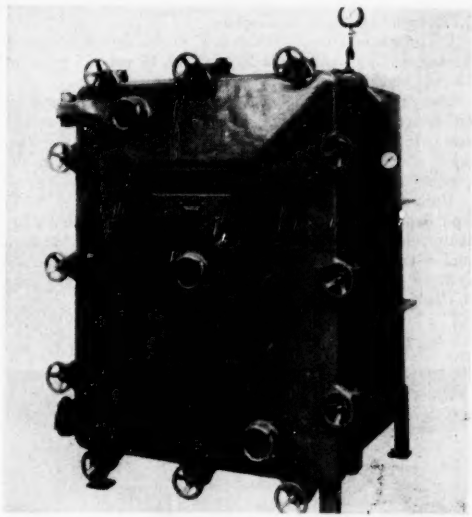
Control is so sensitive that a drop of as little as ⅛ in. in the boiler will actuate the valve. Known as the "Weight-O-Water," this new boiler feed-water controller embodies use of an ellipsoidal balance chamber, a code vessel of 18-in. dia. which is hung on a precisely engineered spring to permit its rising and lowering. At the top of this chamber, an annealed copper tubing is connected and flexibly looped to communicate with the water column piping of the boiler. The chamber is connected to the bottom of the boiler's water column with piping and, to insure flexibility of chamber movement, two swivel joints are used.

Perfect equalization of levels between the chamber and boiler is provided. If water level rises ⅛ in. in boiler, it rises ⅛ in. in chamber. Up and down movement of chamber actuates a super-sensitive control valve requiring less than ½ lb. of force to actuate. The valve, opening and closing in response to up-and-down movement, controls amount of water fed to boiler.—*J. A. Campbell Co., 645 E. Wardlow Road, Long Beach 7, Calif.*

New Colors Offered In Facing Tile

Builders' flexibility in design and decorative harmony is increased with nine new colors of ceramic glaze structural facing tile. Color decisions were made in close conjunction with decorators and to meet architectural requests.

Field shades in the new chromatic line include venetian cream, colonial mottle, blush coral, blush coral mottle, spring yellow, pewter gray, gulf-stream green, glacier green and silver pine mottle. Trim shades are chocolate, fall red and ebony.—*Metropolitan Paving Brick Co., Canton, Ohio.*



Vacuum Shelf-Drier for Speed at Low Cost

Construction changes in vacuum shelf driers for efficient, high speed, low cost drying at absolute pressures in the low micron range has been announced.

New units are built of welded steel. Rigid tests assure vacuum tightness under extremely low absolute pressure drying procedures. Drier shelves, with internal baffles, are arranged to provide uniform heat throughout the entire shelf area.

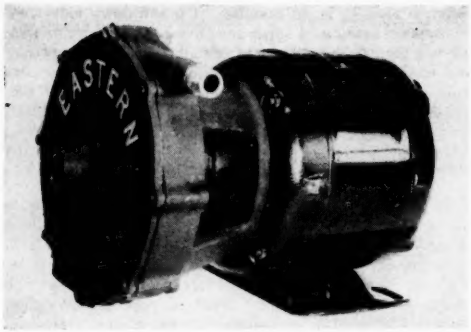
The jacketed construction of top surface of shelf drier prevents condensation of the vapors passing toward the vacuum connection.

Lower section of vacuum shelf drier is fitted with a drain gutter and outlet to permit cleaning of unit without spillage.

A swivel spotlight, attached to drier door, permits close observation of material during drying process. This spotlight can be moved quickly and easily to any one of the large glass ports in the door.

Driers are available in five chamber sizes, with shelf spacing to suit specific requirements.—*F. J. Stokes Machine Co., 5976 Tabor Road, Phila. 20, Pa.*

(*Food Equipment Continued*)



Offers Centrifugal Pump for Moderate Ranges

For those applications where moderate pressures and volumes are required, a new centrifugal pump running at 1,725 rpm. has been developed.

Performance curve on the new pump shows a shutoff pressure of 19 psi., shows 10 gpm. at 15 psi., 15 gpm. at 10 psi., and in excess of 20 gpm. at free flow.

Designated as Model H, the pump is constructed in either bronze or aluminum, with lifetime mechanical rotary seal. Inlet is ½ in. NPT female, and the outlet is ⅜ in. NPT male. A ⅛ in. NPT drain plug is located in the pump body.

Units are available with motors ranging from 1/6 to ⅓ hp., depending on operating range desired. With 1/6 hp. motor, the overall size is 12⅓ in. long x 7¾ in. high and 8 3/16 in. wide, and the weight in bronze construction is 37 lb.—*Eastern Industries, Inc., 296 Elm St., New Haven 6, Conn.*

Cartridge Demineralizer Attaches to Faucet

Intended to deliver the low-cost chemical equivalent of distilled water, without heat and at a maximum rate of 10 gal. per hr., a redesigned Filt-R-Stil cartridge demineralizer is reported to offer high efficiency.

It consists of three principal parts: A disposable cartridge containing ion-exchange resins; a bracket or support for the cartridge; and an electrical conductivity indicator.

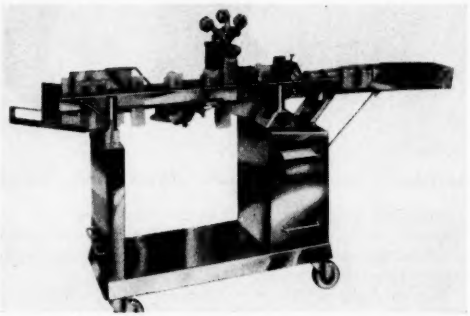
Quality of treated water is shown continuously with the improved conductivity indicator.

To install, the unit need only be fastened to a wall and the inlet tubing attached to a cold-water faucet. When the water is turned on, it flows through the cartridge and emerges essentially mineral-free.

Water-delivered by the cartridge unit is guaranteed to contain no more than 10 ppm. of dissolved ionized solids, exclusive of silica. Quantity of water treated per cartridge depends on the quality of the raw water available.

Rated capacity of the cartridges used is 1100 grains (as $CaCO_3$). Thus, one cartridge will produce at least 550 gal. demineralized water from a 2-grain-per-gal. supply.

Unit can be operated either continuously or intermittently, and it delivers demineralized water in a matter of seconds after the tap is turned on.—*American Cyanamid Co., Ion Exchange Products Dept., 30 Rockefeller Plaza, New York 20.*



Packages Ice Cream of Many Types

Requirements of medium-sized plants are reported met by a new automatic packaging machine, Model 175, for a No. 2 Philadelphia style ice cream package.

Stainless steel and nickel alloy construction is used throughout, except for the enclosed clutch housing and cams.

Manufacturer reports this machine will handle all types of continuous frozen ice cream—such as ice cream with whole nuts and fruits; 1, 2, and 3 flavors; variegated ice cream; and fancy centers.—*Anderson Bros. Mfg. Co., Rockford, Ill.*

Flight Conveyor for Bulk Materials

Elimination of manual labor in the bulk transporting of solid or fibrous material of a loose mixture is one of the principal advantages of the Houdaille Conveyor.

It is a continuous, automatic materials transport and will move any material which will settle to the bottom of a tank, hopper, bin, or other form of reservoir. If the material has settling qualities, the system can be adapted to any transportation problem relation to either production materials or waste products.

The conveyor consists of a series of neoprene or cast iron flights, assembled on an endless chain. The chain and flights are pulled through a pipe casing by means of a high torque gear transmission.

Material to be transported is picked up from the bottom of the reservoir, carried to the delivery point, then released through the open section in the casing.

Custom-bent to the specifications of the origin and delivery points, the casing is of 2, 4, or 6 in. dia., depending on the capacity requirements of the particular installation. Other sizes are available when needed.—*Honan-Crane Corp., 706 Wabash Ave., Lebanon, Ind.*

(Food Equipment Continued)

BRANCHES IN PRINCIPAL CITIES OF U.S.

WEST-O-GRAM

AGENCIES THROUGHOUT THE WORLD

WEST DISINFECTING CO. 42-16 WEST ST. LONG ISLAND CITY 1, NY
TO ALL READERS OF: FOOD INDUSTRIES

NEW WEST MISTORIZER AUTOMATICALLY SPRAYS
INSECTICIDES FASTER FURTHER AND WITH LESS EFFORT
IT IS THE ONLY AUTOMATIC INSECTICIDE SPRAYER IN
AMERICA WITH SO MANY NEW EXCLUSIVE FEATURES
FREE DEMONSTRATION UPON REQUEST WRITE OR WIRE AT ONCE

DEPARTMENT OF ENTOMOLOGY
WEST DISINFECTING COMPANY
42-16 WEST ST. LONG ISLAND CITY 1, NY

FEATURES

- Toggle switch operates on AC and DC
- Optional time clock at no extra cost (AC only)
- Automatic shut-off
- Operates 1 to 24 minutes (or manually)
- G.E. 1/8 HP Universal motor
- Requires no filters, oiling or greasing
- Patented airflow system cools motor
- Completely leak-proof
- Wide neck for easier filling
- Rotary Compressor creates spray (this is not a fan-type unit)
- Graphitar lubrication allows unit to run wet or dry
- Clog proof spray nozzle 180° adjustable
- Container withstands chemical action of insecticides
- Precision built to save time and labor and for trouble-free years of service
- Aluminum alloy casting rust resistant
- Low center of gravity for easier handling and aids in preventing unit from tipping over
- Specially built-in fuse assembly protects against burn-outs
- Utilizes every drop of insecticide
- Instantaneous and continuous full pressure spraying
- Density of spray easily regulated by air volume control dial
- Ball bearings hermetically sealed
- No condensation of steam or water to dilute insecticide

USE WEST'S VAPOSECTOR FLUID, A HIGHLY CONCENTRATED INSECTICIDE ESPECIALLY FORMULATED FOR MOST ECONOMICAL AND EFFICIENT RESULTS WITH THE NEW MISTORIZER.

Vaposector Fluid is harmless to humans—non-corrosive—non-staining—will not contaminate foodstuffs. Write for further information and free demonstration.

HERE'S A QUICK-LIFT TIME-SAVER FOR YOU!

NEW SINGLE STROKE

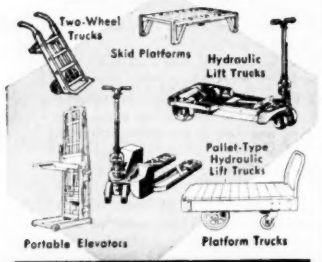
"Weld-Bilt" PRODUCTS

MECHANICAL LIFT TRUCK

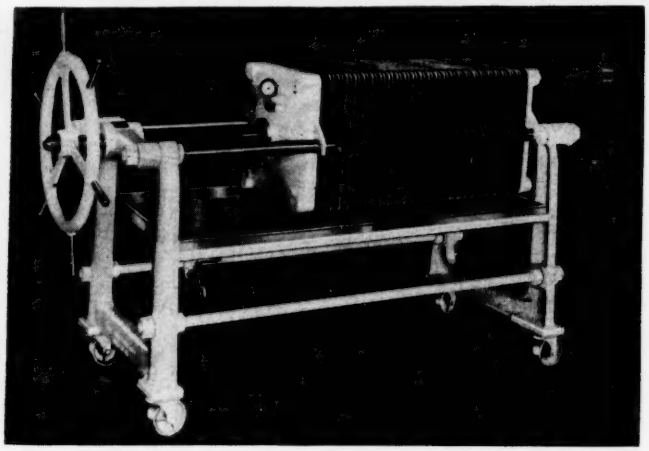
Push this new Weld-Bilt Truck under a load, give the handle one quick stroke — and you're ready to roll! With the full 360° swivel you can easily maneuver the load. And you can lift the load from ANY ANGLE within 270°. Many other features make this new WELD-BILT Mechanical Lift Truck important to your materials handling operations . . . features like the Handle Safety Spring that keeps handle in safe vertical position when not in use; Automatic "anti-kickback" Handle Release; smooth, full-hydraulic lowering; Front Wheel Equalizer to keep load level and eliminate handle shock and whip . . . and many others.

This new addition to the popular "Weld-Bilt" line can save time and money in your operations. Let us tell you about it — without obligation! It's available in narrow and wide widths, standard lengths, for capacities up to 2500 lbs.

Weld-Bilt Products Include:



WEST BEND EQUIPMENT CORPORATION
MATERIALS HANDLING ENGINEERS
301 Water St. WEST BEND, WIS.



Hard Rubber Sheets Used in New Filter

For such liquids as wine, cider, vinegar, and others which have a tendency to be spoiled by metallic pickup or which attack metals, a new hard rubber filter, Model EUR, has been developed.

The unit is available in sizes from a 10-disk model having 2,350 sq. in. of filtering surface to a 100-disk model having 23,500 sq. in. of filtering surface. Sheet size is identical to that used in similar bronze or stainless steel filters—16 in. x 16 in. sq.

Filtration capacities, based on viscosity of water and filter sheet density, range from 5 to 50 gpm.

Design permits elimination of rubber washers, since the filter sheets provide the positive seal, and outlet frames prevent sheet breakage. A single handwheel reduces loading and reloading time to a minimum and maintains perfect alignment of filter frames. Filter paper or asbestos filter sheets may be used.—*Ertel Engineering Corp.*, 50 *Front St., Kingston, N. Y.*

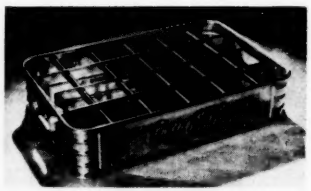
Unit Provides Lubricants In Controlled Amounts

Lubricant waste and messy conditions are eliminated on bottling, canning and other chain conveyors by the use of a new type lubricator known as the "Bevcolator".

It incorporates a new principle which provides controlled amounts of lubricants only when needed. Lubrication automatically stops when the conveyor is not in operation.

Unit is installed on underside of conveyor as close as possible to sprocket returning chain to top. A special synthetic organic compound used with the unit combines cleaning, lubricating and penetrating action all in one. Lube does not contain any animal fats or waste which tend to gum up linkage on conveyors.

"Bevcolube," the lubricant, is ideal in cold room operations because it does not thicken or harden at low temperatures.—*Consolidated Siphon Supply Co., Inc.*, 22-24 *Wooster St., New York City* 13, *N. Y.*



Light Sanitary Bottle Case Made of Aluminum Alloy

Of interest to bottlers is a new case constructed of a strong, light alloy capable of resisting great impact loads. An aluminum alloy containing magnesium (hence the name Alnesium) was selected as basic material for the case.

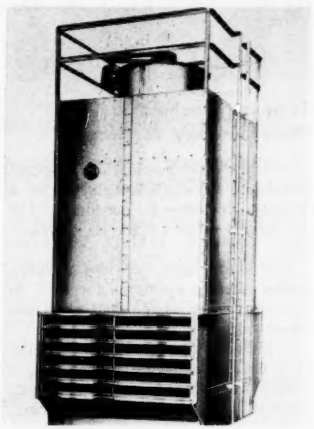
Alnesium is bright, cannot rust, resists corrosion, and needs no painting. Dirt cannot be embedded in the metal, nor will it attract bugs and vermin. The 3½ lb. case was designed for easy cleaning when returned to the bottling plant. There are ample drainage holes and no dirt catching crevices.

Many patented mechanical features have gone into the construction of the new case. Additional durability is

secured by the embossed separators and rounded corners. Multiple metal thicknesses have been added at all points of stress. Mechanical interlocking joins parts positively and securely. Reinforcing wires are rolled into the top and bottom edges.

The interior of the case is constructed so that it "floats" in the frame and acts as a shock absorber for its load of 24 bottles. The cross rods are rubber insulated providing additional protection against scuffing or breakage. It is stated that this rubber, like that used in automobile tires, will last as long as the case itself.

Case can be used with standard bottling plant machinery and equipment. Inside dimensions are standard, and though outside dimensions are smaller than usual, the difference is slight enough to permit it to be used interchangeably with other cases.—*Reynolds Metals Co., 2500 S. Third St., Louisville.*



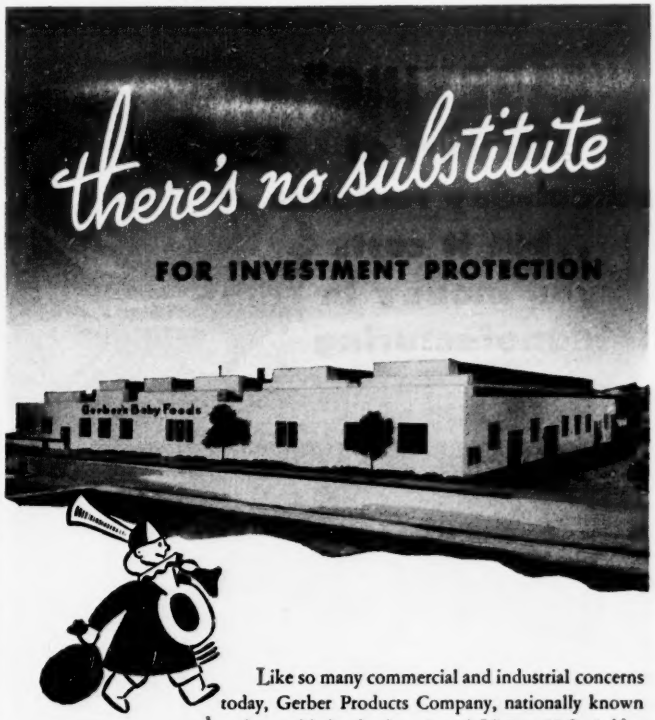
Ease of Erection Features New Cooling Tower

Recognition of the need for a medium to large capacity cooling tower that is easy to erect and requires little maintenance time has led to addition of a new cooling tower, the Verflow, to a standard line of water-cooling equipment.

Designed in wood or steel, the unit contains features of water cooling design previously found only in heavy duty industrial towers.

Unit's outstanding features are: Nail-less filling, making it easy to remove and reinstall; balanced spray system with patented low pressure nozzles; access port to inspect and clean nozzles; totally enclosed motor; inclosed bearing housing with grease-

(Food Equipment Continued)



Like so many commercial and industrial concerns today, Gerber Products Company, nationally known makers of baby foods, selected *"Automatic" Sprinkler* investment protection for their modern plant in Oakland, California. Their choice as you'll understand from the following, was a wise one; for in addition to safeguarding the lives of some 600 valued employees, *"Automatic" Sprinkler* protection is remarkable from an investment point of view. The sprinkler installation in this case allowed for immediate insurance premium reductions of $24,000.00 annually . . . savings which will amortize the cost of protection in about 4½ years, following which annual dividends will continue to accumulate.

This particular illustration is not unusual, for depending upon the risk, insurance savings of upward to 90% may be realized through the installation of *"Automatic" Sprinkler* protection. It's good reason why thousands of business executives throughout the country specify multi-value fire protection with *"Automatic" Sprinklers, an important investment today . . . perhaps welcomed protection tomorrow.*

TYPICAL *"Automatic" Sprinkler* PROTECTED PROPERTIES

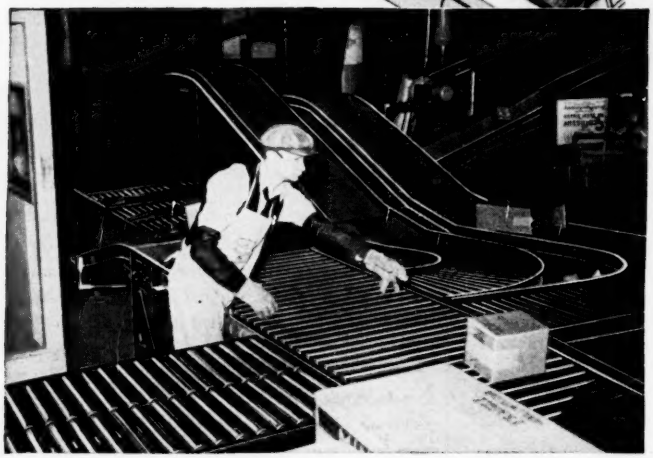
Industrial Plants
Storage - Warehousing
Mercantiles
Piers - Wharves
Aviation Properties
Hospitals - Institutions
Hotels - Apartments
Schools - Colleges
Offices - Public Buildings

"Automatic" FIRE-FOG provides positive protection for severe fire hazards

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FOR INVESTMENT PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

"CARRYING"
..is part of school-day romance ..but it costs you money in manufacturing



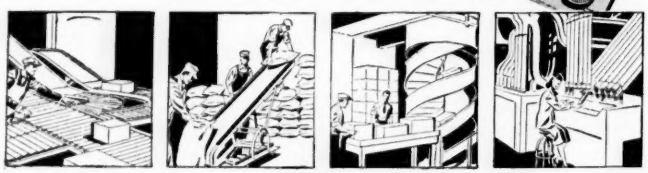
"CARRYING" commodities to and from production, assembly, processing or packaging lines costs too much. It's a waste of time and manpower.

Put conveyors to work "carrying" — packages, parts, units — loose or in containers — up, down, or across-through manufacturing or processing to storage or shipping. Speed handling operations—save time and costs.

The range, versatility, and flexibility of Standard Conveyors have been developed in more than 40 years of service to businesss and industry. See Standard for any conveyor need.

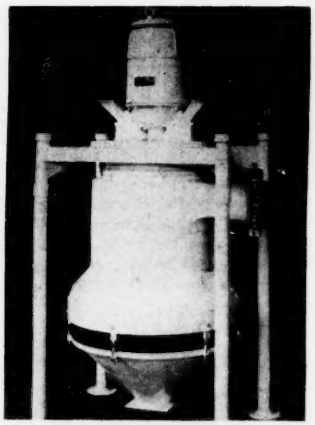
STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minnesota
Sales and Service in Principal Cities

Send for Standard's General Catalog—see how conveyors are used to best advantage in every field of industry. Ask for Bulletin No. FI-69.



ROLLER · BELT · SLAT · CHAIN CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

packed bearings; airfoil section cast-aluminum-alloy fans (multiple-celled units if desired); hinged louver frames and removable louvers; and complete basin fixtures.—*The Marley Co., Inc., Kansas City, Mo.*



Compact Machine Provides Three Sanitary Services

Infestation destruction, scouring and aspiration are all accomplished by a recently introduced machine. The equipment is notable for its compactness.

This 3-in-1 unit provides a much needed cleaning operation for grain to minimize extraneous matter before processing.

In addition to continuous destruction of insect life, external and internal, it breaks up infested kernels exposing internal insects and excreta. Further, it subjects the grain to thorough scouring, dislodges crease dirt, beeswing, beard and other foreign materials. This matter is then removed by aspiration.

The machine is approximately 5 ft. high and 2½ ft. in dia. It is easy to install and inexpensive to operate. It consists of an overhead motor connected directly to a special rotor.

This rotor is made of two steel disks spaced slightly over 1 in. apart by specially designed impactors. Rotors of various diameters and design are available. They are easily interchangeable to permit different peripheral speeds and flexibility of application for specific requirements.

Free flowing dry material entering the inlet of the machine is fed by the distributor to the center of the rotor, then spun by centrifugal force into a thinning film as it approaches the perimeter of the rotor. It is discharged

from the rotor in a uniform spray, to a conical shaped hopper.

As the material falls through the hopper, the light debris, in a state of suspension, is caught by suction and carried into the dust collector.

The air suction fan and dust collector system are not furnished. Any commercial type fan having an air delivery of 1,000 to 1,500 cfm. at a static pressure of 1 to 2 in. of water should have ample capacity.

Regulation of air is by control of rpm. of the fan or by varying the size of the fan or the air outlet.

This equipment is made in three capacities: 2,500, 10,000, and 15,000 lb./hr. Motors are 220/440, or 550v., 3 phase, 60 cycles.—*Entoleter Div., The Safety Car Heating & Lighting Co., Inc., New Haven 4, Conn.*

Sound-Alarm Systems Indicate Failure or Change Off Normal

Safety shut-downs and sequencing or interlocking of plant operation are made possible by "Panalarms," industrial signal systems.

They are multiple signal and alarm systems with a broad range of use in process work, power plants, and in many other applications where sound and visual alarms are required to indicate failure or abnormal operation.

Changes in such equipment as remote switches, thermostats, and float switches, which can be reflected by an electric impulse to open or close a small relay, will actuate the signals.

Safety and reliability are insured by having the lamps glow dimly during normal operation. If the signals go out of service or the bulbs burn out, the operator knows it at once.

Where there is an abnormal condition, two signal lights go on and a warning is given by a horn, or other sound device. The horn is turned off, and the white light goes off, when the failure is acknowledged by operator.

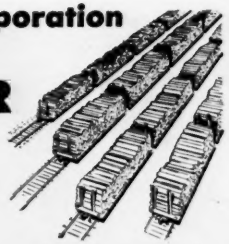
Many combinations of lights and signals are available to indicate the trouble line, also to indicate when corrective measures have been taken, and finally when the line is cleared back to normal.—*Panalarm Products, Inc., 7216 N. Clark St., Chicago 26.*

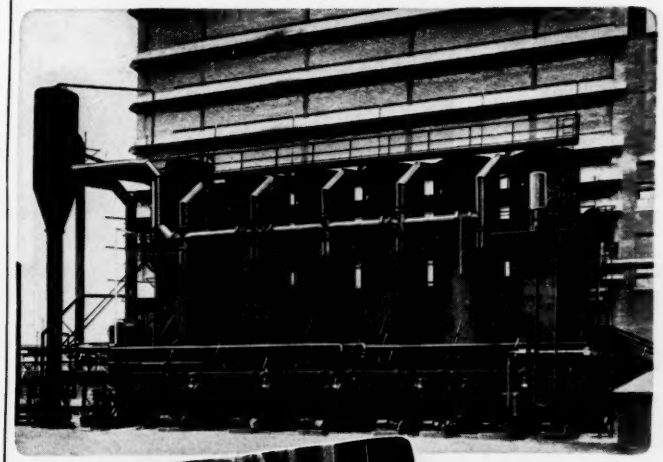
(Food Equipment Continued)

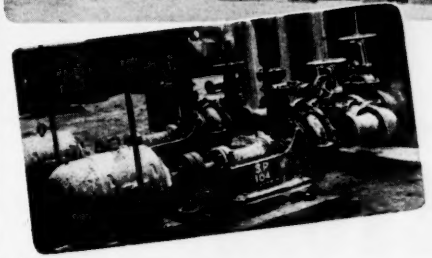
Southern Paperboard Corporation Selects

LUNKENHEIMER VALVES

for Port Wentworth Mill







Sextuple evaporator furnished by General American Transportation Corporation. Lunkenheimer Valves in caustic lines.

Lunkenheimer Valves in pumping operation on black liquor tank.

IN THIS outstanding new plant, as in many of the nation's other paper mills, LUNKENHEIMER Valves were selected for tough jobs. Producing an average of 450 tons of liner-board and similar products per day, a minimum of ten million gallons of water are used every 24 hours.

For the lines handling caustic and alkaline liquors (black, green and white), "CAUSUL" Metal Gate Valves were specified by the engineers, J. E. Sirrine Company of Greenville, S. C.

In other parts of this giant plant, Iron Body Gate Valves and "Ferrenewo" Valves were used where bronze valves did not meet requirements. Numerous other LUNKENHEIMER Valves, including "King-Clip" and Hose Gate were installed.

Selected for applications in many industrial fields, "CAUSUL" Metal Valves handle close to 100 corrosive solutions ranging from Acetic Anhydride to Zeolite and including acids, solvents, alkalis, alcohols, food products, brines, and wastes.

YOUR LUNKENHEIMER DISTRIBUTOR

maintains adequate stocks for your needs. Ask him for Circular No. 592 which gives complete details on "CAUSUL" Metal Valves, and for confidential information blank from which definite recommendation for your corrosive service can be prepared. Other descriptive literature also available.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

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NEW YORK 13 CHICAGO 6 BOSTON 10 PHILADELPHIA 34

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no two conveying problems are alike!

that's why FOOD PROCESSERS need the FINGERPRINT ENGINEERING that comes with

ALVEYORS*

the word for every conveyor need

There are many possible layouts for moving cases, cartons, and units of merchandise from one operation ... and from one department ... to another. But for one individual plant there is one best, most efficient, economical way. As no two fingerprints are alike ... so is your plant different from the others! Alvey Conveyor Mfg. Co.'s experience in the food industry ... with well-known installations from coast to coast ... speaks for Alvey flex-ABILITY ... for Alvey's fingerprint approach to every conveying problem.

*Trademark

Bag Flattener

Recently announced unit is portable piler and bag flattener. It elevates bags as it flattens them.

Units are being built to elevate bags from 12 to 20 ft. at an incline up to 70 deg., while occupying a minimum of floor space.

Electrically operated, the unit may be moved around the plant under its own power. All four wheels have swivel action, hence may be steered with ease.

Endless steel coil springs running over grooved steel rollers are employed on the lower conveyor and hugger boom. Produced is a kneading action to eliminate air from paper bags. The unit is adjustable to nearly every bag size, and it performs two operations in one—i.e., the bags are conveyed for piling while they are flattened for more even arrangement in piles. *Flexoveyor Mfg. Co., 315 E. & C. Bldg., Denver, Colo.*

Freeze Drier

Designed for research and development technicians is the new model 2004-L self-contained freeze drier with 12 sq. ft. of shelf area.

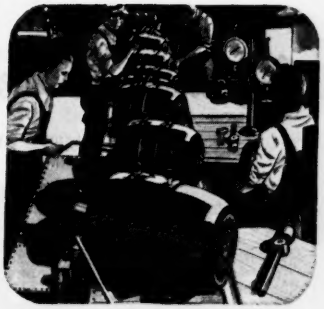
It combines efficiency of large scale units with flexibility and compactness of small laboratory models.

New design permits use of one compressor for both prefreezing and condensation. Neither dry ice nor desiccant is required.

Equipment consists of a welded steel vacuum shelf drier with two drier shelves; a motor-driven pump to circulate electrically heated, thermostatically controlled water; Freon compressor; high vacuum pump with centrifugal oil clarifier, vacuum piping and valves; complete insulation; vacuum gage; controls and instruments.—*F. J. Stokes Machine Co., 5900 Tabor Road, Philadelphia 20, Pa.*

—*End*

1 1897—America's first cars, hand-built and expensive, looked like this. Big questions of the day were—will it run? can I ever afford to buy one? Little thought was given to washing a car.



2 1915—Howell "Red Band" Motors arrived. The electrical horsepower age was already under way. Automobiles, as well as other goods and services, were soon to be better, cheaper.

3 1935—This combination brush and spray was one of many early car-washing devices. It wasn't until 1945 that modern assembly line methods began to be applied to the washing of cars.

NOW, A WASH WHILE YOU WAIT!

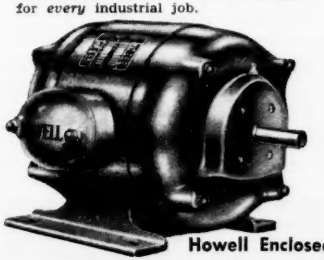
4 Today—Automatic car washers, like this, equipped with nine totally enclosed Howell Motors, turn out a glistening, clean car in a jiffy! Back-breaking labor is gone, valuable time is saved—all so that more people can enjoy better living at less cost.

Working in a shower of water is a tough job for electric motors. But, here again, Howell Motors have made good. These rugged, industrial type motors are an important source of power not only for car washing but also for fans, pumps, conveyors, dairy machines, and all other important industrial jobs.

Are you using Howell Motors? Try them!

Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.

Howell totally enclosed motor built for operation in high humidity atmosphere. Remember, there's a Howell Motor for *every* industrial job.



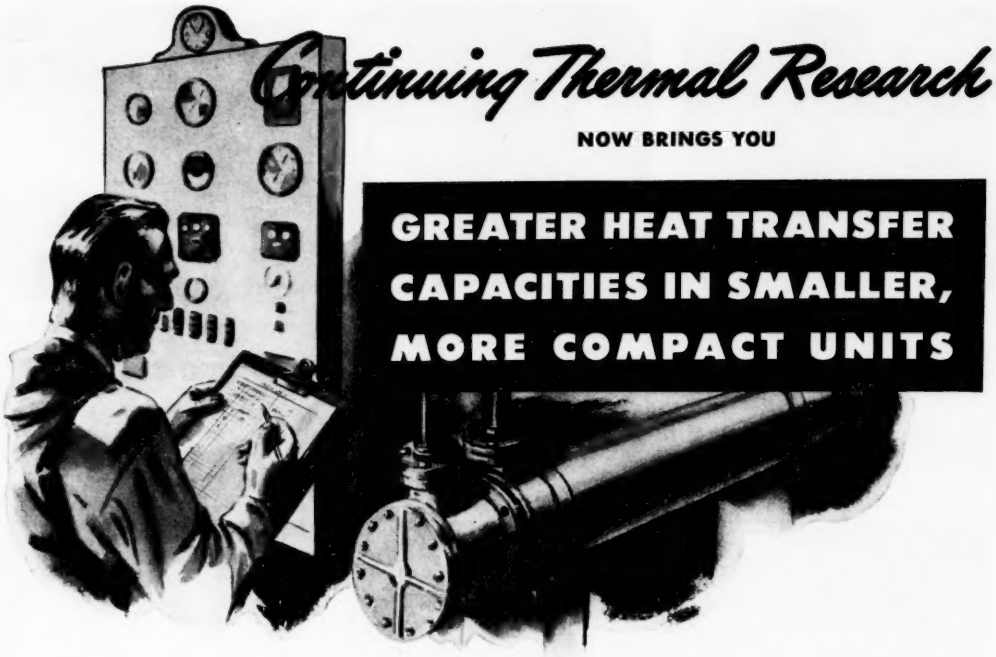
Howell Enclosed or Splash-Proof Motor

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

HOWELL Red Band MOTORS



Continuing Thermal Research

NOW BRINGS YOU

GREATER HEAT TRANSFER CAPACITIES IN SMALLER, MORE COMPACT UNITS

OUT of the engineering department and research laboratory at Ross comes a steady flow of new manufacturing techniques and design improvements achieving continually higher levels of heat transfer efficiency and lower levels of cost per B. T. U.

Already widely known to primary equipment manufacturers and users are the tradition-shattering developments of the now famous Ross "BCF" line of exchangers. Now, of equal importance to practically every industry, comes news of the design changes to another of industry's favorites, the long established "CP" Exchanger — *another direct result of recent conclusions reached by continuing Ross thermal research.*

Having successfully accomplished the means of "cutting to the bone" ineffective areas, bypassing, eddies and excessive pressure drops, Ross now provides in the various sizes comprising the "CP" Exchanger line, *a greater heat transfer surface in a smaller, more compact unit.*

. . . and backing up these noteworthy performance developments are new manufacturing techniques as applied to the customary Ross mass production system of standardized parts manufacture. Closest practicable clearances between tubes and baffle holes, baffles and shell, and bundle and shell — *absolutely vital to complete, fully effective use of heat transfer surface* — are consistently and uniformly produced by new, precision, mass quantity manufacturing methods.

So, added to "CP" Exchangers' greatest asset — the custom assembly from mass produced standard parts — you now have more compact units embodying greater heat transfer capacity, to meet your individual requirements at lowest cost.

Ross Heater & Mfg. Co., Inc., Division of American Radiator & Standard Sanitary Corp., 1443 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ontario.

★ **DATA BACKS UP ALL CLAIMS: To find out how smaller "CP" clearances can make a high percentage difference in your heat transfer costs, write Ross today.**

ROSS "CP" EXCHANGERS

Serving home and industry

AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Catalogs, Bulletins

Food Plant Equipment

Coolers

Stainless steel, direct flooded ammonia coolers are covered in Bulletin 180. Installation views and food product application flow drawings for cooling dairy products, water, sirup and wort are included.—*Mojonnier Bros. Co., 4601 W. Ohio St., Chicago 44.*

Spray Drier

Principles, advantages, and applications of spray drying to pumpable materials are discussed in Bulletin D-105, with illustrations and flow sheets for specific operations.—*Swenson Evaporator Co., 30 Church St., New York City 7.*

Dust Control

Dynamic hydrostatic precipitation of dust, in which cleaning action is obtained with an inverted S-shaped water curtain, is feature of Rotoclone Type N. Dimensional drawings, specifications and performance characteristics complete Bulletin 277A.—*American Air Filter Co., First & Central Ave., Louisville 8, Ky.*

Beverage Mixer

Easy changing from one size bottle to another and thorough mixing are advantages of beverage mixer reported in information sheet. Also illustrated and described are a conveyor chain lubricator, bottle conveyor line, and accumulating table.—*Keenline Equipment Corp., Oshkosh, Wis.*

Ice Cream Packaging

Ice tray packages, No. 2 linerless pints, and No. 2 linerless quarts are three types of portable ice cream packaging machinery described in color folder. Machines form, fill and close packages for one, two, or three flavors. Photos, dimensional drawings, and specifications are included.—*Pure-Pak Div., Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit, 32.*

Butter Deodorizer

Higher-score butter of uniform flavor and longer storage life is said to result with use of the Super Deodorizer detailed in Bulletin 40A. Controlled neutralization, lower churning temperatures and economy are reported advantages.—*Jensen Creamery Machinery Co., Inc., 228 N. LaSalle St., Chicago.*

Vacuum Fillers

Free-flowing and non-free-flowing powders are filled under vacuum with speed, accuracy and dust-free operation by fillers detailed in two-color folder. Filling heads are easily changed for different size containers, and speed may be adjusted to that of other units in packaging line.—*Mechanical Div., General Mills, Inc., 1620 Central Ave., Minneapolis 13.*

Sanitary Pumps

Centrifugal operation with open-type impeller for handling liquids of varying viscosities, individual bearing housing, and direct motor drive are features of pumps discussed in 12-page folder. Specifications, "exploded" views, and capacity tables are included.—*Specialty Brass Co., Kenosha, Wis.*

Hose Stations

Concealed hose stations, stanchions and mixing units for steam, hot, and cold water are covered in 5-page folder. Intended for installation in dairies, the units are reported to provide positive, complete mixing in any proportion of elements passed through them.—*Klingerit, Inc., 16 Hudson St., New York City.*

Liquid Vitamin Injector

Automatic addition of liquid vitamin D concentrate to milk in HTST pasteurizers and continuous homogenizing systems is described in Vit-O-Feeder Bulletin. —*% Proportioneers, Inc. %, 9 Codding Street, Providence, R. I.*

Caustic Filtration

Suspended impurities in caustic cleaning solutions are removed by new filtration process. Units and new filter powder, delineated in 6-page foldout, are available for all bottle washers.—*The Michael Yundt Co., Waukesha, 1, Wis.*

Plastic Cream Cooler

Economy in shipping charges and improved stability of product are said to result from use of plastic cream chilling and packing machine. Complete directions, prices and illustrations are included in folder.—*W. M. Sprinkman Corp., 4022 North Port Washington Ave., Milwaukee 12, Wis.*

Boilers

Steel boilers for heating, power and process steam are covered with specifications, data tables, photos and dimensional drawings in 24-page catalog—*Kewanee Boiler Co., Kewanee, Ill.*

Storage Tanks

Flooded ammonia or Freon refrigerants are used in high-pressure cold-wall dairy storage tanks described in 4-page bulletin.—*Steriline Dairy Equipment Div., Steel & Tube Products Co., 4300 N. Port Washington Rd., Milwaukee, Wis.*

Steam Generator

Overall thermal efficiencies of 75-80 percent for forced recirculation steam generators are reported in 8-page booklet. Included is information on principles of operation and also general data tables.—*Clayton Mfg. Co., El Monte, Calif.*

Materials Handling

Table Truck

Perforated and solid clean-draining trays are easily removed from table truck which is described with specifications on pocket-size sheet. —*The Schlueter Co., Janesville, Wis.*

Conveyors

Overhead cable, wheel rail, and belt conveyors, and a hand- or electrically-operated freight ladder are illustrated in Bulletin B8.—*Triangle Equipment Co., 45 River Rd., Nutley, N. J.*

Conveyor Belts

Impact resistance two to six times that of fabric belts is reported for parallel rubber-coated cord belts in 6-page catalog 2200. Principles of construction and photos explain elasticity, lack of ply separation, and resistance to moisture penetration and mildew.—*B. F. Goodrich Co., 448 S. Main St., Akron.*

Electric Hoist

Dimensions, photos, and descriptions of parts of Bearcat electric hoist are included in Bulletin P-53.—*The Harrington Co., 17 & Callowhill St., Philadelphia 30.*

Floor Chain Conveyor

Shop trucks equipped with a vertical pin may be moved about a circuit by floor type tow conveyor described with typical plant layouts in 4-page folder.—*Jervis B. Webb Co., 8951 Alpine Ave., Detroit.*

Wire Belts

Open mesh, woven wire conveyor belts of various alloys and mesh sizes for different applications are discussed in Bulletin 84.—*Cambridge Wire Cloth Co., Cambridge, Md.*

Feeders

Machines for measuring, feeding and preparing dry and liquid materials in water and sewage treatment and in continuous processes are covered in 66-page catalog.—*Omega Machine Co., 3409 E. 18 St., Kansas City, Mo.*

Lift Trucks

Fork, low- and high-lift trucks, and tractors in 40 different models photographed in food plants appear in 16-page booklet *Logistics in Food.*—*Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14.*

Materials Handling Movie

Availability of a 30-minute sound movie, *The One Man Gang*, covering principles of materials handling, is announced in 20-page booklet.—*Towmotor Corp., 1226 E. 152 St., Cleveland 10.*

Lift-Truck Clamp

Bales, boxes, bags, bundles, and oil drums are handled without pallets by side-squeezing, hydraulically operated "load-grab" attachment for lift trucks. Photos and specifications are included in foldout.—*Hyster Co., 2902 N. E. Clackamas St., Portland 7, Ore.*

Control Equipment

Instrument Applications

Articles on controlled air conditioning of modern smokehouses, industrial waste treatment, and uniform tempering of chocolates, appear in house organ *Instrumentation*, Vol. 3, No. 6.—*Minneapolis-Honeywell Regulator Co., Brown Instruments Div., 4498 Wayne Ave., Philadelphia, 44.*

Metered Lubrication

Units for positive control of flow of lubricating oil into small machines with one-shot or automatic operation are discussed in Bulletin 4C. A section on how to design a lubricating system into the small machine is included.—*Bijur Lubricating Corp., 43-01 22 St., Long Island City 1, N. Y.*

Recording, Indicating, Controlling

Instruments for recording, indicating, and controlling are classified in Bulletin W1805.—*The Bristol Co., Waterbury 91, Conn.*

Liquid-Level Transmitter

Measurement of pressure and liquid level of viscous or corrosive liquids, or liquids containing solids in open tanks or closed tanks under pressure or vacuum, is purpose of force-balance liquid level transmitter announced in Bulletin 98069. Application drawings, graphs, and

(Catalogs, Bulletins Continued)

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Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

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CONTINUOUS PULP PRESS

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JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits . . . with the hydraulically operated cake discharge port or "floating cone."

Long the finest dewaterer on the market Zenith's new 100% automatic operation assures CONSTANT UNIFORM discharge pressure at any pre-determined degree. Finger-tip adjustment assures drier cake of uniform consistency.

These engineering triumphs . . . found only in Zenith Press . . . are available to paper pulp, cannery, corn starch, fish reduction, meat packing, glue, citrus waste drying and many other processes.

For further plant uses, for individual problems or for engineering or additional data, write Jackson & Church Company at Saginaw, Michigan.

A PRODUCT OF
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN
"Work well done since '81"

Catalogs, Bulletins

exp'anation of principle of operation are given. —*Taylor Instrument Co., Rochester 1, N. Y.*

Canning Instrumentation

Control of juice heating, retorts, and jam and jelly production is function of instruments described in 4-page folder.—*The Foxboro Co., Foxboro, Mass.*

Plant Supplies

Packaging Materials

Corrugated shipping boxes for specific product requirements, including insulated corrugated cartons for shipping perishables, and package ideas for sales promotion are treated in 8-page house organ *Package Laboratory News*, Vol. 8, No. 2.—*Hinde & Dauch Paper Co., Sandusky, Ohio.*

Frozen Food Packing

Use of a transparent, odorless plastic wrap in four-step packaging process for locker plants or small packer is stated to offer complete protection to frozen foods. Four-page bulletin illustrates steps and materials required.—*Dewey and Almy Chemical Co., Cambridge, Mass.*

Neoprene Adhesives

Synthetic rubber emulsion adhesives and their applications are discussed in 12-page house organ, *The Neoprene Notebook*, No. 42.—*Rubber Chemicals Div., E. I du Pont de Nemours & Co., Inc., Wilmington 98, Del.*

Floor Materials

Information on various materials used in the construction of floors, and outlines of procedures for laying them are included in Booklet AIA No. 3D. Metallic concrete and corrosion-resistant concrete floors, cold storage and emery floors, impervious brick and insulating concrete floors are covered.—*Floor Material Industries, 420 Lexington Ave., New York City 17.*

Monosodium Glutamate

Chemical and physical data on monosodium glutamate and directions for use in meats, poultry and fish, soups and chowders, canned vegetables, potato chips, cheese and other products appear in folder and technical data sheet. —*A. E. Staley Mfg. Co., Decatur, Ill.*

Vibration Control

Installations in which five forms of cork may be used to control transmission of vibration and noise, installation data, and information on specification writing are given in illustrated bulletin C-1.—*Korfund Co., 48-53 E. 32 Place, Long Island City 1, New York.*

Milk Containers

Double-sealed slant-top paper milk containers are reported, in 4-page folder, to be superior in economy, sanitation and ease of use. Process and machinery for fabricating are detailed.—*Pure-Pak Div., Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32.*

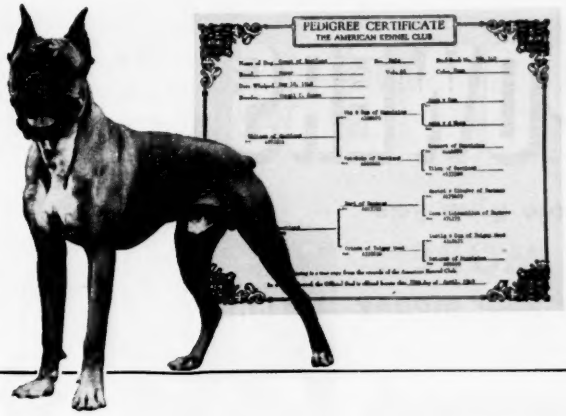
Cleaning Compound

A water softening ingredient is added to a detergent base to make the laboratory cleaning compound discussed in 4-page folder.—*General Biochemicals, Inc., 10 Laboratory Park, Chagrin Falls, Ohio.*

Water Conditioner

Intended for commercial and industrial water systems using as high as 1,000,000 gal. per month, the water conditioner described in 4-page folder is reported to stop line scale and

(Catalogs, Bulletins Continued)



THE BOXER, America's No. 1 favorite for 1949, gets his name from the fact he uses his front paws in much the same way as a human boxer when fighting. Coloring of coat ranges from fawn to brindle, but his muzzle is always black.

Buyers Who Know

Look at the Pedigree

TRADE MARK
UNION

Dependable Packaging Since 1872

THE UNION SHIELD is the pedigree mark of a box with 75 years of packaging leadership behind it.

That's why Standard Brands uses Union boxes to carry Royal Puddings —choice of millions—to dealers all over the country.

The Union shield means every step in the making, from tree to finished box, is tested and controlled by one management in America's largest integrated pulp-to-container plant.

Four modern box plants, five of the world's largest paper machines, and vast timber tracts are your guarantee of consistent quality, consistent service and fair price, today and in the future.

That's why every month more makers of famous brand products are shipping in Union boxes.

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: **SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

POWERS No. 11 Self-Acting REGULATORS

now give you MORE for your money

OVER-HEAT PROTECTION

No Extra Charge

Sizes: ¼ to 2" inclusive

VALVE STEM LUBRICATOR

UNSURPASSED FOR DEPENDABILITY and LONG LIFE

Lower Maintenance Cost and—

BETTER

CONTROLS HEATING OR COOLING MEDIUMS LIQUIDS OR AIR

TEMPERATURE CONTROL

SIMPLIFY your temperature control problems by standardizing on POWERS No. 11 Self-acting Regulators. Use them when you want a simple rugged control to maintain a constant temperature. They prevent OVER-heating, save fuel and labor, pay back their cost several times a year and give years of dependable control.

Backed by over 55 years of experience in self-acting regulators. Engineering service available in over 50 cities.

No. 11 INDICATING REGULATOR has 4" dial mounted on top of regulator. Both thermometer and regulator operate from same thermal system. Visual check on performance of regulator is provided making it easy to adjust for different temperatures. (1185)

TYPES AVAILABLE—Direct and reverse acting regulators with Double Seat balanced valve, double unions ½ to 2" incl., flanged 2½ to 6" incl.; Single Seat valve double unions ¼ to 1¼" incl. 3-Way valve ½ to 4" incl. —shown in Bulletin 329. **Use coupon below**

THE POWERS REGULATOR CO., 2793 Greenview Ave., Chicago 14, Ill.

Gentlemen: Please send me Bulletin 329. Am interested in control for

Name _____ Title _____

Firm Name _____

Address _____

Catalogs, Bulletins

prevent red water while increasing water softener capacity.—*Bruner Corp., 2318 N. 30 St., Milwaukee 10, Wis.*

Pressure Sensitive Tapes

Scotch and industrial pressure-sensitive tapes of all tape manufacturers and their uses in production and shipping are covered in 24-page illustrated catalog.—*Robert Spector Co., 22 Park Pl., New York City 7.*

Color and Light Analysis

Effects of artificial lights on color are among topics in comprehensive 16-page booklet, *Color is How You Light It.*—*Commercial Engineering Dept., Sylvania Electric Prods., Inc., 500 Fifth Ave., New York City.*

Miscellaneous

Insulation

"Protecting Seed Life During Storage" and "Refrigeration Losses Through Freezer Doors" are two food industry articles appearing in *Insulator*, Vol. 19, No. 2—*Armstrong Cork Co., Building Materials Div., Lancaster, Pa.*

Gas Heating

"Combustion Principles and Equipment Selection in the Use of Gas for Heating Large Buildings" is title of 16-page reprint, from *Heating and Ventilating*, illustrated with tables and schematic drawings.—*American Gas Association, 420 Lexington Ave., New York City 17.*

Filing Systems

Booklet including stills from motion picture *It Must be Somewhere*, announces availability of colored sound film. Projection equipment and operator go with film on modern filing methods.—*Systems Div., Remington Rand, 315 Fourth Ave., New York City.*

Steam Humidifiers

For automatic control of relative humidity for prevention of dry air damage to hygroscopic materials, steam humidifiers are suggested in 12-page Bulletin 1771.—*Armstrong Machine Works, Three Rivers, Mich.*

Plastic Signs

New concepts in sign design, using Plexiglas for electric displays, are offered in 12-page booklet.—*Plastics Department, Rohm & Haas Co., 222 W. Washington Sq., Philadelphia 5.*

Casters

Long life of pressed-steel swivel casters of "Lock-Weld" construction which eliminates the king-pin, is subject matter of Bulletin 21-31.—*The Fairbanks Co., 393 Lafayette St., New York City 3.*

Dielectric Heating

High frequency dielectric heating for a variety of applications is explained in 12-page booklet. Included are specifications and dimensions of heaters. Food uses suggested are thawing frozen foods and dehydrating fruits and vegetables.—*Allis-Chalmers Mfg. Co., S. 70 St., Milwaukee, Wis.*

New Lab Equipment

Innovations included in *What's New for the Laboratory*, No. 7, are three dimensional apparatus support, automatic pipette washer, pressure regulator, contact-making thermometer, solution dispenser, electrically heated vacuum pump, and non-slip rubber gloves.—*Scientific Glass Apparatus Co., Inc., 49 Ackerman St., Bloomfield, N. J.*

—*End*

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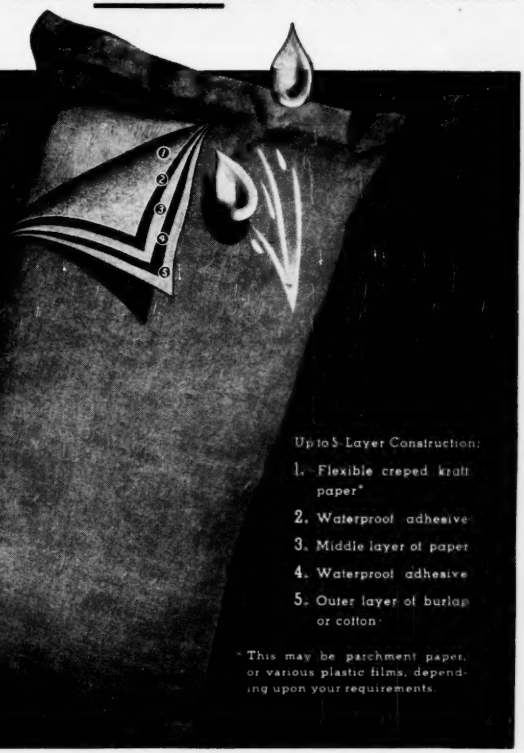

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New Technology

VITAMINS

Vitamin Content of Pork

Thiamin content of pork from garbage-fed pigs is considerably lower than that from grain-fed animals. This is in line with the difference in rations —grain has 3-4 micrograms per g., garbage only 2.1. No difference in niacin and riboflavin content of the different meats was apparent.

Five pairs of pigs were used in the experiment. Each pair, consisting of two animals from the same litter, was placed on the experimental ration at the same time and kept on it throughout the fattening period. The grain ration contained 83 parts rolled barley, 8 parts each of meat meal and soybean oil meal, and 1 part salt. Garbage was from military camps, and of high quality. Animals were slaughtered at the end of fattening period and 2 shoulders, the liver and part of the loin were taken for sampling.

Cooking and storage losses were also determined. Thiamin loss was greatest—60 per cent in roasting the whole shoulder, 40 percent in frying pork chops. Niacin also showed considerable loss: 35 percent in roasting, 25 percent in frying. No consistent cooking losses of riboflavin were observed. Storage of ground samples for 5-9 months at −5 to −10 F. resulted in no loss of either riboflavin or niacin, and little or no loss of thiamin.

Digest from "Thiamin, Riboflavin, and Niacin Content of Raw and Cooked Pork from Grain-Fed and Garbage-Fed Pigs," by E. Hartzler and W. Ross, *Food Research*, 15-23, Jan.-Feb. 1949.

MEATS

Rancidity in Frozen Pork

Ultraviolet irradiation of skinned pork carcasses during the aging period prior to freezing, speeds fat rancidity during subsequent freezer storage. Skin on the pork, or shading the carcasses prevents the rapid formation of peroxides in the surface layer of the fat.

In a study designed to determine to what extent UV radiation may affect the keeping quality during prolonged frozen storage of meat products exposed to these lamps in a locker plant cooler, beef, pork and chicken were aged at 36 deg. F. in a room equipped with UV lamps. Control samples were aged in a separate cooler not so equipped. Beef loin was aged for 10 days; the pork and poultry for 5 days, before packaging and storing at 0 deg. F. Only the pork showed a definite increase in peroxide during storage. When the upper sections of the loins were exposed to UV light, while the lower parts were shaded with brown paper, the lower parts showed no significant formation of fat peroxides during one year's storage at 0 deg. F. Peroxides were not found in the fat of unskinned samples and control samples after similar periods of storage.

Digest from "The Effect of Ultraviolet Light in the Meat Cooler on the Keeping Quality of Frozen Pork," by F. E. Volz, W. A. Gortner, E. W. Pitz, Jr. and J. T. Miller, *Food Technology*, 4-7, Jan. 1949.

FERMENTATION

Riboflavin Enhances Phosphate Exchange

Radioactive phosphate exchanged by yeast in the presence of glucose has been substantially increased by the addition of trace amounts of riboflavin to the suspending medium. Increases range from 20 to 200 percent over the phosphate exchanged by controls in glucose alone.

Results are the more remarkable because yeasts are known to be relatively rich in riboflavin. The effect has been found in two widely different species of yeast, *Candida albicans* and *Saccharomyces cerevisiae*.

Existence of a "P-complexing factor" at the cell surface is suggested by the investigators as a valid explanation of the phenomenon. Since it is unlikely that phosphate enters the cell in ionized form, it seems reasonable that phosphate is brought through the cell barrier by uniting with some "complexing substance" at the cell surface. The compound of this substance with phosphate may then dissociate losing phosphate to the cell and freeing the "complexing substance" to act again. Observation leads to the belief that riboflavin fills such a role.

Digest from "Riboflavin Enhancement of Radioactive Phosphate Exchange by Yeasts," by W. J. Nickerson and E. J. Mullins, *Nature*, Vol. 161, 939-40, June 12, 1948.

Contamination of Beer

Spoilage organisms in beer most generally arise from sources inside the brewery. The dangers of air-borne infection, malt dust, workmen's clothing, and similar sources have been overemphasized. Because beer is medium low in pH, contains a powerful bacteriostat in the hop extracts, and is normally stored under anaerobic conditions, it will not support the growth of the hundreds of types of microorganisms that may be isolated from air, water, dust, malt, sugar and other possible sources outside the brewery. Those species that do grow are peculiar to breweries, and have not been reported elsewhere.

Experiment has shown that wort exposed to the air for a long time will ferment and remain bacteria-free if inoculated with bacteria-free yeast. On the other hand, sterile wort inoculated with ordinary brewery yeast develops bacteria spoilage in about 14 days. Yeast containing 4 bacteria per 100 yeast cells, will add 400,000 bacteria per ml. of wort if pitched at the rate of 1 lb. per bbl. Even if there are few or no visible bacteria in the yeast, the inoculum may still add several thousand bacteria per ml. of wort.

Inadequately washed barrels and infected brushes may be sources of spoilage bacteria. Wooden tanks and barrels are virtually impossible to sterilize and are likely to be permanent foci of spoilage bacteria.

Hopped wort media, usually used for the isolation of beer bacteria, favor the growth of molds, yeasts and Gram-negative bacteria over the slow-grow-

(New Technology Continued)

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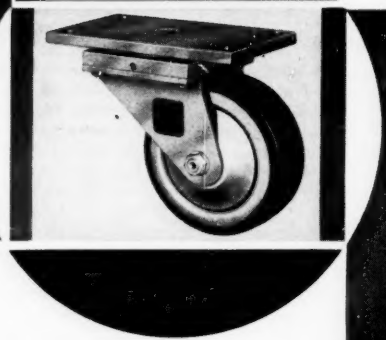

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ing, hop-sensitive lactic acid bacteria that are the important types in beer spoilage. Consequently other media should be used for their isolation. Neutral or alkaline media favor the growth of harmless airborne organisms that would not grow at the pH of beer (5.0). Different media, temperatures, and some anaerobic cultures should be used if the real beer flora are to be isolated and identified.

Digest from "Sources of Bacterial Infection in the Brewery" by J. L. Shimwell, *Journal of the Incorporated Brewers Guild*, Vol. 35, No. 413, 88-107, March, 1949.

CEREAL PRODUCTS

Moisture Content of Wheat

There is a marked difference in the way that moisture is adsorbed and desorbed by wheat and flour at ordinary temperatures, and the combined adsorption and desorption curves can exhibit considerable hysteresis. The curves for flour differ from those of wheat, and the hysteresis is less. Complete desorption of water vapor at temperatures of 77-95 F. was not possible even after several days of evacuation with a mercury diffusion pump.

When wheat grains in a single layer are exposed to an atmosphere of constant humidity, constant moisture content is reached in a time that depends in part on the rate of diffusion of water vapor up to the surface of the grain through the atmosphere, and in part on the rate of the diffusion of moisture within the grain itself. In a rapidly moving atmosphere, such as that produced by a circulating fan, only the latter rate is important, and it has been found that the skin of the wheat berry offers little or no resistance to the movement of moisture into the berry. Equations derived from Frick's law fit the observed values fairly well. The deviations from observed values indicate that the diffusion rate does not remain constant, but varies on adsorption and desorption with the moisture content.

When wheat in depth is exposed to a moist atmosphere, moisture equilibrium may be reached very slowly for the mass as a whole. For example, wheat grains in a single layer reached equilibrium at 15.5 percent moisture in an atmosphere of 75 percent relative humidity after about 48 hr. For a depth of 1.1 in. 400 hr. were required, while for a depth of 6.6 in. the moisture content was only about 5 percent after 400 hr. Only the surface layers of wheat in large masses undergo any marked changes in moisture content.

The experiments indicate that it is

(New Technology Continued)

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Technical GLYCERINE NEWS

NEW FRESH FRUIT SPREADS. A new heatless process, utilizing glycerine, is claimed to produce fruit spreads which retain the natural flavor, aroma, and color of the fresh fruit. (F-7)

★ ★ ★

FOR BETTER CAKES the use of frozen eggs processed with glycerine is suggested. Cakes made with eggs of this type are alleged to possess a smoother, firmer, more even grain than cakes made with either fresh eggs or non-glycerinated frozen eggs. (F-8)

★ ★ ★

A NEW TYPE SAUSAGE COATING, claimed to be prepared from calcium carbonate, glycerine, gelatin and water, is said to prevent discoloration or browning of the outer meat surface and to maintain the original color of the meat throughout. (F-9)

★ ★ ★

TO AGE AND PACKAGE CHEESE, a process has been patented in which cheese is coated with a special flexible wax casing, then wrapped in a protective sheet of cellophane-like material which is completely moistened with an aqueous solution of glycerine and gum arabic. The glycerine facilitates wrapping, and helps to plasticize the protective sheet when the package is dried to cause the wrapper to shrink and compress the casing. (F-10)

GLYCERINE PRODUCERS' ASSOCIATION, DEPT. 8
295 MADISON AVENUE
NEW YORK 17, N. Y.

I should like to know the source of those items appearing in Technical Glycerine News which I have checked below.

☐ F-7 ☐ F-8 ☐ F-9 ☐ F-10

NAME.....

COMPANY.....

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NEW

SPENCER COLONY COUNTER

Even the pinpoint bacterial colonies are easy to count —quickly and accurately — with this new Spencer Dark Field Quebec Colony Counter. Employing the principle of the dark field microscope, it has a unique annular reflector which illuminates the specimen symmetrically with oblique rays of light and leaves the background subdued. As a result it provides:

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the diffusion of water vapor through the air and outer layers of grain that limits the moisture uptake of the grain, rather than resistance of the grain to movement of moisture within it. The time required for movement of moisture across the surfaces of the grains and into their interior is ordinarily a small fraction of the time required for the movement of the water vapor up to the surfaces.

Digest from "Observations on the Adsorption of Water Vapor by Wheat" by J. D. Babbitt, *Canadian Journal of Research*, Vol. 27F, 55-79, February, 1949.

FRUIT PRODUCTS

Cold Processed Fruit Spread

Gelled fruit products that retain most of the flavor, color and nutritive values of the original fresh fruit, are the objects of a recently patented process. Steps in the process include: Pureeing the ripe fruit; adding powdered pectin mixed with sugar (not over 30 percent of soluble solids) or glycerine, and stirring until pectin is hydrated; adding fruit acid to adjust pH to 3.5 or lower, dissolving remainder of sugar in the puree; packaging the mixture and allowing it to stand at 70-100 deg. F. until properly gelled; then preserving in freezing storage.

Digest from U. S. Patent 2,459,431, issued Jan. 18, 1949, on an application dated April 26, 1946, to G. Johnson, Albany, and M. M. Boggs, Berkeley, Calif., and assigned to the U. S. A.

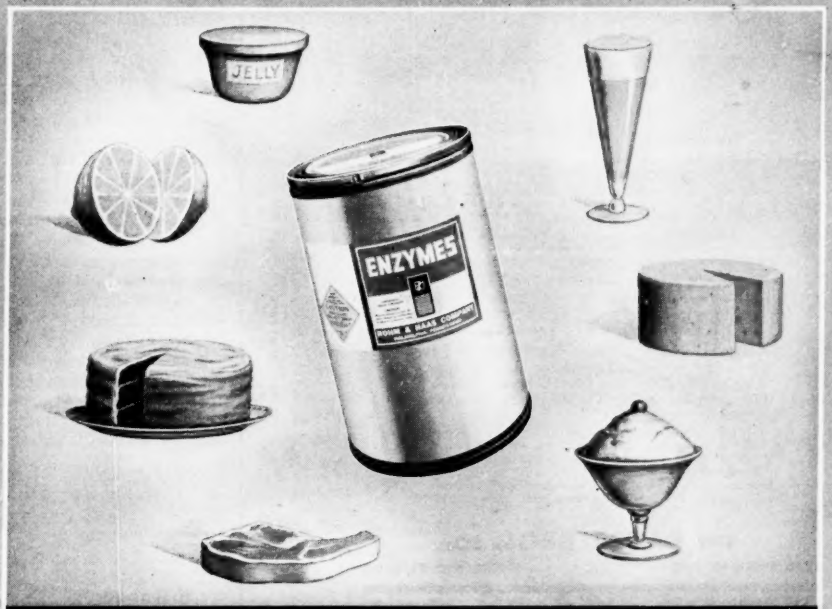
PACKAGING

Aluminum Cans for Foods

Aluminum cans have been used in Norway and Denmark since before 1935 for preserving a variety of food products from canned fish to evaporated milk. Fabrication of Al cans for sardines has been developed in Norway to a point where automatic machines turn them out at a rate of 8,000 per hr. To increase the strength of tops and bottoms, ribs, concentric or parallel to a diameter, are pressed into the metal. Both anodized (oxidized) and lacquered cans have been used in an effort to prevent corrosion of the interior. The purer the Al the less the corrosion but the greater the cost of the metal. The only alloy in common use is one containing 1.25 percent Mn. It works very well for canned smoked fish products which are very corrosive to ordinary Al, but it is more costly and more difficult to fabricate.

Al cans do not rust externally but

(New Technology Continued)



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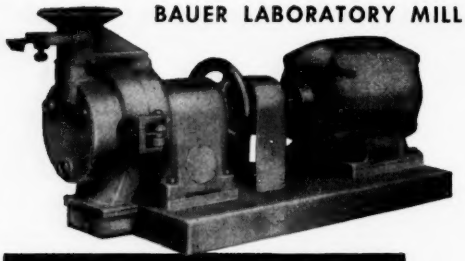

FOR SAMPLE AND TEST RUNS

This mill is equipped with a 3 or 5 h.p. built-in motor or V-sheave for belt drive. It is built with the precision required for laboratory use, but has ample stamina for production service.

The U. S. Dept. of Agriculture approves it for preparing cottonseed, soybean, and tung nut samples. The American Tung Oil Assn. specifies it for sample grinding. The American Chemists' Society endorses it.

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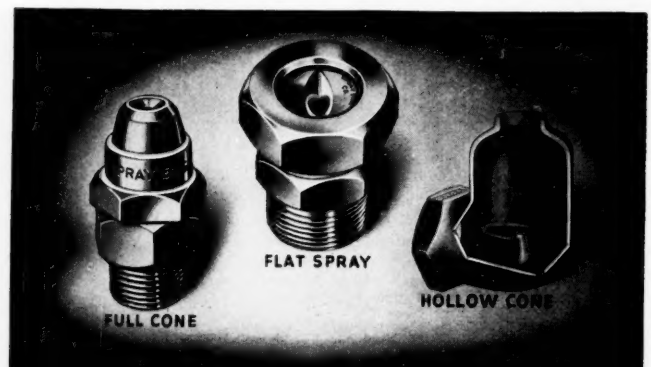

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are subject to corrosion by humid and salty atmospheres, especially when in contact with other metals. Alkaline detergents can be highly corrosive, and label glues should be neutral and not contain hygroscopic salts. Because of their lesser strength, Al cans must be processed carefully to avoid deformation from internal pressure during heating and cooling.

Trials with ordinary, anodized, lacquered, anodized and lacquered Al, and tinplate cans, on fish and shellfish, vegetables, and meat products, showed that anodized lacquered Al cans developed hydrogen swells at about the same time as tin-plate cans. Ordinary Al was equal to tin-plate for fish canned in oil, and for peas and asparagus. Pickled fish products or meats with salty or sour sauces attacked ordinary Al quickly. None of the products in Al cans developed a metallic taste or turned black, as their controls in tin-plate cans did in some cases.

Digest from "The Possibilities of Using Aluminum For Packing of Preserved Foods and the Results of Experiments Recently Carried Out in Denmark," by Prof. Bramsnaes, *Revue des Fermentations et des Industries Alimentaires* (Brussels), Vol. 3, 196-202, Dec. 1948.

ENGINEERING

Corn Germ Removal Process

Separation of pure germ from corn by a new method that is said to result in maximum yield with a minimum amount of equipment, at low operating cost is described in a recently granted patent.

First, sufficient water is supplied to the corn to bring its moisture content to 20-30 percent by weight. This condition is maintained for a sufficient period to distribute the moisture uniformly through the corn. The corn is then cracked to loosen the germ, and more water is added to bring the total moisture content to 67-75 percent. Subsequent vigorous agitation produces a starch milk of sufficient gravity to cause easy and clean separation of the germ by flotation.

Digest from U. S. Patent 2,459,548, issued Jan. 18, 1949, on an application dated Dec. 6, 1944, to P. A. Singer and H. J. Deobald, Peoria, Ill., and assigned to Allied Mills, Inc., Ind.

Beverage Premix System

An improved system for preparing carbonated beverages prior to bottling is detailed in a recently granted patent. The apparatus consists of: A mixing tank; means for maintaining a partial vacuum in it; water and sirup tanks with conduits connecting them to the mixing tank; calibrated valves

(New Technology Continued)

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● Food Processing Tanks
● Steam Jacketed Kettles
● Chemical Processing Tanks
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in the conduits for controlling the flow of sirup and water; and means for shutting off the flow of sirup and water when the level in either tank falls to an extremely low point.

In operation, sirup and refrigerated water are delivered to their respective supply tanks. A vacuum is drawn in the mixing tank. Calibrated valves are set to deliver the desired quantities of sirup and water to the mixing tank. These enter the tank through a common inlet nozzle, then flow over a series of pans which complete the mixing, and into the bottom of the tank. From here, the mixture is pumped to the carbonator. A float in the mixing tank shuts off further supply of sirup and water when the liquid level backs up to a predetermined point.

Digest from U. S. Patent 2,457,903, issued Jan. 4, 1949, on an application dated July 16, 1943, to J. Kantor and E. F. Rosenberg, Chicago, and assigned to The Liquid Carbonic Corp.

SUGARS

Acetyl In Sugar Beet Pectin

Presence of acetyl radical apparently explains the failure of sugar beet pectin to form jellies. To check this theory, pectin acetates containing 0.4-11.7 percent acetyl were prepared from a high grade citrus pectin of proved jellying ability.

Samples containing 3.5-5.2 percent acetyl either entirely failed to form a sugar-acid-pectin jelly, or formed a weak gel on long standing—the result of slow hydrolysis. Samples containing 8.6-11.7 percent acetyl were only slightly soluble in the jelly medium and were not studied further.

Acetyl was removed by hydrolyzing the pectin acetate at pH 1 at room temperature for as long as 400 hr. The hydrolyzed products formed jellies in the same way as the original pectin. This proved that small percentages of acetyl radical in pectin prevent the formation of 65 percent solids jellies.

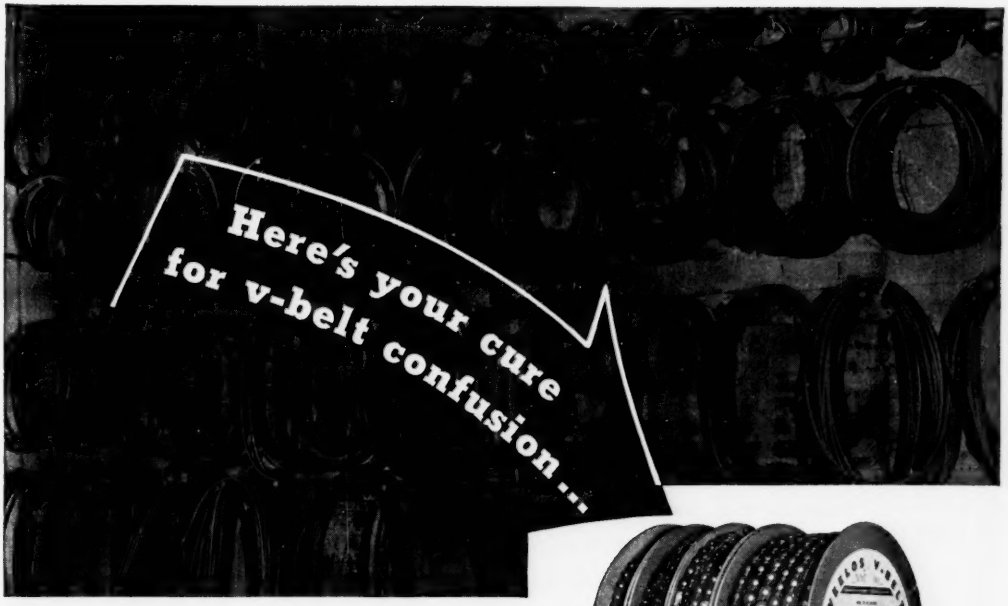
Digest from "Gelation Properties of Partially Acetylated Pectins," by E. L. Pippen, R. M. McCready and H. S. Owens, presented before ACS meeting, San Francisco, Calif., March 29, 1949.

Imitation Soy Sauce

Improving the aroma and flavor of unfermented liquid flavoring materials resembling soy sauce is the object of a recent patent. This is accomplished by fermenting a sugar-containing solution and adding 5-10 percent of this solution to an unfermented sauce prepared by hydrolyzing protein materials with a hot aqueous solution of HCl.

Sugar-containing solutions may be:

(New Technology Continued)



4 reels of VEELOS can replace 316 sizes of endless v-belts

HAS your v-belt inventory grown too large, too costly and too complicated by too many sizes of endless v-belts? No matter what size your inventory, Veelos can cut it—drastically!

Let's assume that you use O, A, B and C widths. With only four reels of Veelos you can make up more than 316 sizes of endless v-belts. If you use only A and B sizes, your entire v-belt inventory will be complete with just two reels. Any length belt is quickly uncoupled from a reel, made endless and installed.

Ease and speed of installing Veelos lowers machine downtime. On drives with outboard bearings, it is installed without moving the motor or dismantling the machine.

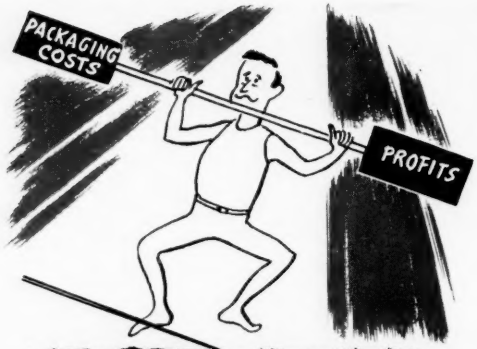
FREE VEELOS CATALOG shows how Veelos can bring many distinct v-belt advantages to your plant. See page after page of illustrations of Veelos at work in industry after industry. Full engineering data is given. Write for your free copy today.

MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PA.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all standard sizes, fits all standard grooves. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 300 distributors throughout the country. Veelos is known as VEELINK outside the United States.

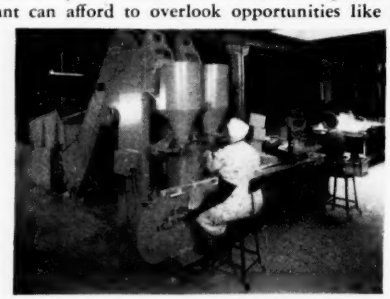


OUT OF BALANCE?

Modern Triangle Packaging Machinery Is the Answer

YOU have to put your product in a package, but the method you use to put it there can make a whale of a difference in your profit and loss statement. Studies by Triangle show that 3 out of 4 packaging departments are wasteful, inefficient profit-robbers. Many plants are not familiar with the opportunities to reduce packaging costs with modern, labor saving, space saving packaging machinery. Triangle users regularly report savings of 25% and more.

FOR EXAMPLE: The Triangle Elec-Tri-Pak Weigher illustrated reduced packaging costs $12,000 per year for a Chicago food processor. There is less waste, less labor, less floor space, better looking packages and the machine paid for itself in well under a year. It's adding $12,000 a year to this manufacturer's net profits. No plant can afford to overlook opportunities like this.



Write for literature and ASK ABOUT THE TRIANGLE PAY-AS-YOU-PACKAGE PLAN. For complete recommendations, send sample filled package and state production required . . . no obligation.

TRIANGLE PACKAGE MACHINERY CO.

6636 W. DIVERSEY BLVD., CHICAGO 35, ILL.

Sales Offices: San Francisco, Denver, Dallas, Atlanta, New York, Pittsburgh, Boston, Jacksonville. *Branch Factory:* Los Angeles.

New Technology

Cane sugar molasses, blackstrap, starch sirups, and solutions of pure sugars such as sucrose, maltose, dextrose and levulose with solids contents of 20-50 percent. Fermentation is produced, preferably, by osmophilic yeasts.

Digest from U. S. Patent 2,459,574, issued Jan. 18, 1949, on an application dated May 19, 1947, to R. F. Larson, R. W. Liggett and W. C. Musselman, and assigned to A. E. Staley Mfg. Co.

MISCELLANEOUS

Growth-Promoting Values Of Different Meat Cuts

Protein in the cheaper cuts of beef is approximately equal in growth-promoting value to the protein in more expensive cuts. This was determined by a study in which lean meat from the round, loin, rib, chuck, neck and shank cuts from the carcasses of a young Shorthorn steer and an aged Hereford cow was fed to groups of white rats. The meat was fed at 7.5, 10.0 and 12.5 percent protein levels of intake in diets otherwise adequate for growth. The diets were also supplemented with amino acids such as cystine.

Results on meats from the two carcasses were in close agreement. In both, indications were that the protein in the cheaper cuts was approximately equal to that in the more expensive cuts. When the meats were supplemented with cystine, the nutritive value of the protein as a whole was greatly increased.

Digest from "Different Cuts of Beef Compared For Nutritive Value," 11, Report of Chief, Bureau of Animal Industry, Agricultural Research Administration, USDA., 1948.

Anti-Corrosion Materials

Sodium benzoate solutions inhibit corrosion of most metals on which they have been tested, with the exception of zinc. The phenomenon was first observed at the Chemical Laboratory at Teddington, England. In a search for substitutes for scarce anti-freeze materials, a large number of compounds was tested for their effects on the cooling systems of automotive engines. Sodium benzoate was found to be one of the most effective as an anti-corrosion agent.

A 1 or 2 percent solution of sodium benzoate in the radiator of an automobile engine completely inhibits corrosive action. For ordinary usage a three or four percent solution is suggested. A 1½ percent solution effectively removes rust and scale from steel surfaces.

Wrapping materials, paper, or coat-

(New Technology Continued)

Get positive lasting protection against these dangers ... with Globe Stainless Steel Tubes

WET AND DRY CORROSION | SCALING

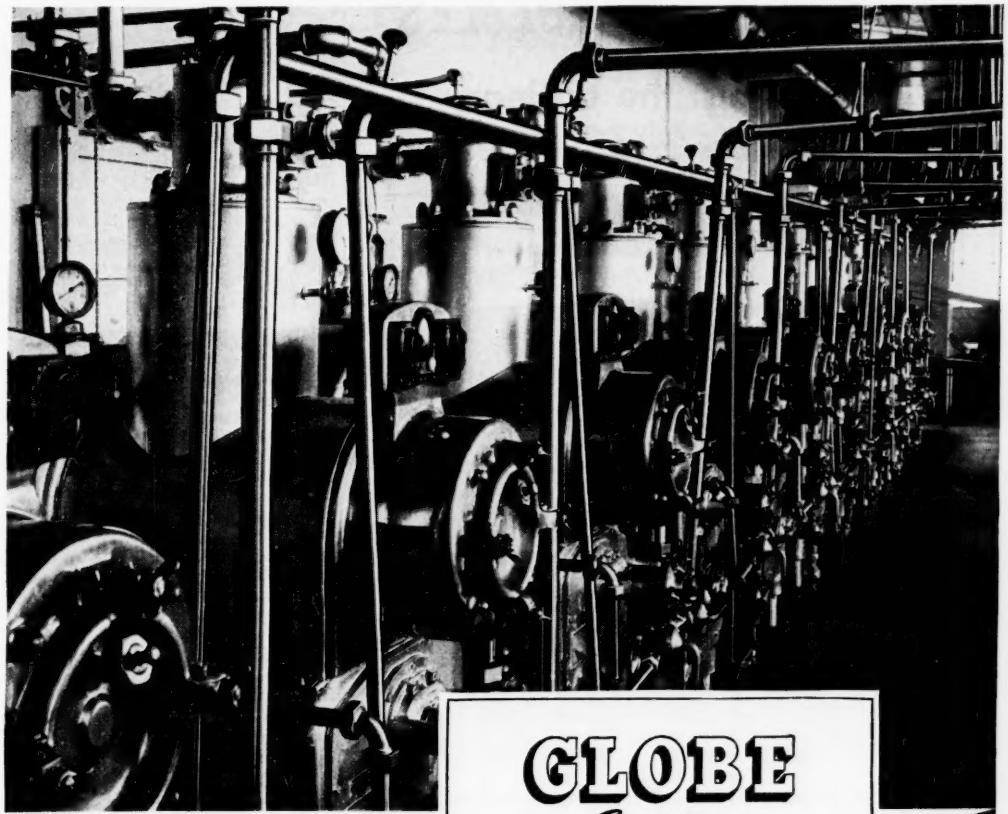
BREAKDOWN AT HIGH TEMPERATURE | PRODUCT CONTAMINATION

You can be sure of positive protection—at lowest cost in service life—if you use Globe stainless steel tubes (seamless or "Gloweld" welded) to safeguard your processing.

Today's wide range of stainless analyses demands technical "know-how" to select stainless steel tubes of the type, size and finish that offer you the most in positive lasting results. We suggest you investigate how Globe's engineering experience plus Globe's modern, completely equipped metallurgical, physical and chemical laboratories can be of service to you in using stainless steel tubes to best advantage.

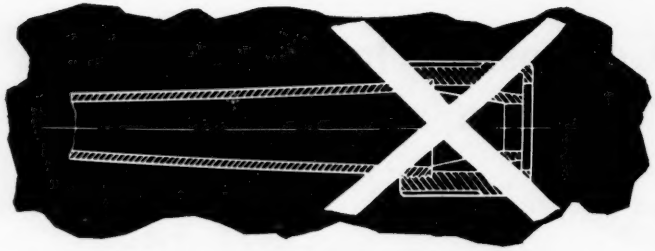
Decide today to check the merits stainless steel tubes offer you — to eliminate processing difficulties — to gain longer, more continuous service life — to reduce costly replacements and production interruptions. Write — GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin.

Photo Courtesy Creamery Package Mfg. Co.



Free valuable technical data in Globe's new Stainless Steel Analysis Chart, Bulletin No. 301.

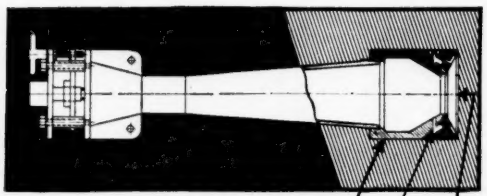
GLOBE
Stainless
STEEL TUBES



NOT THE OLD TYPE NOZZLE,
But, THE NEW TYPE NOZZLE...

"AIROCOOL"
GAS BURNER NOZZLES
PATENTED

...outlast the ordinary nozzle 2 to 5 times



"AIROCOOL" NOZZLE
¼" I.P.S. RAW GAS PILOT
RECESSED REFRACTORY FACING

Our "AIROCOOL" Nozzles have the "earned" reputation of outlasting under fire, *two to five times*, the ordinary inspirator gas burner nozzles. Consequently, they reduce the frequent labor costs, inconvenience, and overhead item of making replacements.

Renewable type recessed gas tips direct the separate igniter flames against the main volume of the mixture to insure stable ignition . . . and allow greater turn-down without burn-back.

"AIROCOOL" Nozzles are made exclusively by us. They are stocked for standard pipe thread sizes 4, 5, 6 and 8 inch for various makes of inspirators. Ask for Supplement 3 to Bulletin 55 . . . it gives detailed information.

OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes; STEAM ATOMIZING OIL BURNERS; MOTOR-DRIVEN ROTARY OIL BURNERS; MECHANICAL PRESSURE ATOMIZING OIL BURNERS; LOW AIR PRESSURE OIL BURNERS; GAS BURNERS; COMBINATION GAS and OIL BURNERS; AUTOMATIC OIL BURNERS, for small process furnaces and heating plants; FUEL OIL HEATERS; FUEL OIL PUMPING and HEATING UNITS; FURNACE RELIEF DOORS; AIR INTAKE DOORS; OBSERVATION PORTS; SPECIAL REFRACTORY SHAPES.

NATIONAL AIROIL BURNER CO., INC.
Main Offices & Factory: 1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PA.
Texas Office: 2512 South Boulevard, Houston 6
INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT

ings of rubber latex or polyvinyl acetate can be made substantially anticorrosive by impregnating or fabricating them with 2 to 5 percent sodium benzoate solutions. Various benzoic esters are also effective.

Digest from "A New Use for Sodium Benzoate" by B. Douglas, *Journal of the Incorporated Brewers' Guild*, Vol. 35, 45-7, February 1949.

Frozen Food Tester

An instrument similar to the pressure-meter sometimes used for determining ripeness of pears or peaches, has been developed to measure the depth to which a food has been frozen. A sliding 1-lb. weight on a guide rod is brought down sharply against an anvil which is part of a ram and bellows. The ram and bellows are in a cylinder containing oil to communicate the pressure of the blow to a gage. When the point of the instrument is held against the frozen sample and the weight is brought down smartly on the anvil, the force of the blow registers on the gage. If the sample is frozen solid, the force of each stroke is approximately the same. In a partly frozen sample the pressure drops when the unfrozen interior is reached. On poultry for example, at 30 deg. F. there is no resistance to the instrument, at 20 F. the resistance is about 50 lb. and at 0 about 160 lb. Construction of the instrument is simple.

Digest from "A Dynamometer for Determining Depth of Freezing in Foods", by H. Tessier, *Canadian Journal of Research*, Vol. 27F, 47-8, February, 1949.

Oxygen in Milk

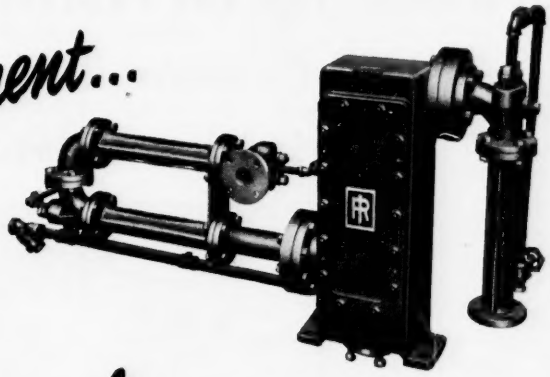
Greatest absorption of oxygen by milk occurs at the time of milking. This is followed by a continued increase before pasteurizing. During pasteurization oxygen content drops, but absorption begins immediately thereafter and continues even during storage of the bottled milk. At the end of 24 hr. oxygen content of bottled milk is approximately the same as that in the weigh tank. Where HTST pasteurization was used, a reduction in oxygen occurred in the closed system, with a subsequent increase on cooling. High bacteria counts apparently result in lower oxygen content of raw milk.

These results were obtained in a study made in four milk plants over several months. Curves and tables are given to show the variations in oxygen content at the different stages of handling and processing.

Digest from "The Effect of Handling and Processing of Milk on Its Oxygen Content," by E. O. Herreid and J. Francis, *Journal of Dairy Science*, 202-8, March 1949.

—*End*

The correct Vacuum Equipment...



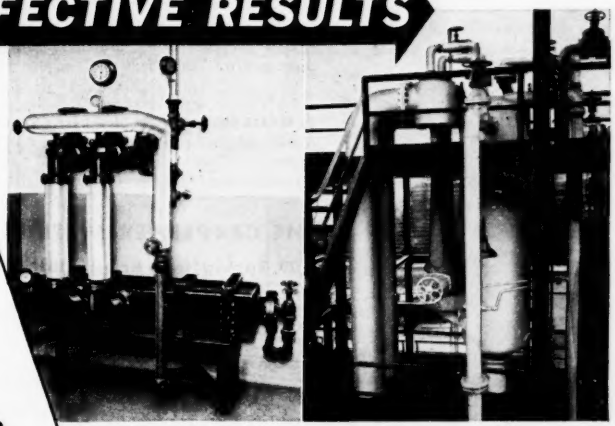
...properly applied by Ingersoll-Rand

To be sure of the most effective results when you're planning on new vacuum equipment, you'll want to know what an Ingersoll-Rand engineer has to say about it. The correct application of ejector equipment can make the difference between an effective installation and one that is costly and inefficient. That's why you will benefit by calling in an Ingersoll-Rand engineer. He will be glad to work with you and give you the advantage of his years of experience with all kinds of vacuum installations.

PRODUCES EFFECTIVE RESULTS

FOR VACUUM EQUIPMENT
Specify I-R

- Steam-jet ejectors
- Reciprocating dry vacuum pumps
- Barometric condensers
- Ejector-jet condensers
- Surface condensers
- Vacuum Refrigeration

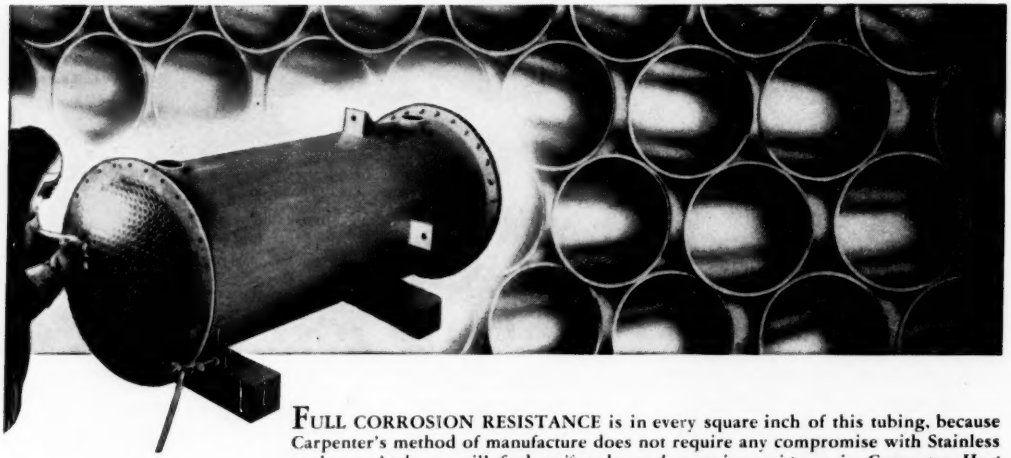


Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

168-4

This is *WHY* YOU CUT PROCESS COSTS with *Carpenter* HEAT EXCHANGER QUALITY Stainless Tubing...



FULL CORROSION RESISTANCE is in every square inch of this tubing, because Carpenter's method of manufacture does not require any compromise with Stainless analyses. And *you* will find *uniformly good corrosion resistance* in Carpenter *Heat Exchanger Quality* Stainless Tubing . . . whether you use 2 lengths or 2,000.

UNIFORM HEATING and COOLING is provided by the *exceptional wall uniformity* of Carpenter *Heat Exchanger Quality* Stainless Tubing. There are no "heavy sections" in the tube wall. Uniform radiation can be provided at all points of the tube's circumference.

SMOOTH I.D. and O.D. SURFACES assure better flow conditions and speed processing. The smooth, sleek surfaces of Carpenter *Heat Exchanger Quality* Tubing guard against excessive scale and sludge formations.

LIGHT GAUGE TUBING can be used because of the *wall uniformity* that protects you against premature tube failure. With Carpenter *Heat Exchanger Quality* Stainless Tubing there are no "thin sections" where stress or corrosion could get an early foothold.

16-PAGE BOOK OF ENGINEERING DATA ON HEAT RESISTANCE & HEAT TRANSFER

A note on your company letterhead will start this Stainless Tubing information on its way to you . . . Physical Properties, Heat Resistance and Heat Transfer Characteristics, Velocity Constants and many useful tables. Write today for your copy.

THE CARPENTER STEEL CO. • *Alloy Tube Division*

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Carpenter

HEAT EXCHANGER QUALITY

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

24-HOUR SERVICE—You get definite delivery information within 24 hours when you call your Carpenter Stainless Tubing Distributor.

Books

Toxic Foods

FOOD POISONING, *revised edition. By G. M. Dack. Published by University of Chicago Press, 5750 Ellis Ave., Chicago 37, 1949. 184 pages; 6¼x9¼ in., cloth. Price, $3.75.*

This revision of a book first published in 1943 brings together information and discoveries gained during World War II on poisoning problems in the processing and distribution of foods.

Advances through research in the chemical nature and purification of Botulinus toxins and on the factors affecting the protection of dehydrated meat from botulin are examples of the topics reported. Staphylococcus food poisoning in military areas, also led to further studies, using bacteriophage typing of Staphylococcus strains isolated from food and from possible carriers. In the field of salmonellosis, a significant percent of egg powders was found to contain one or more types of Salmonella.

Oriental Diet

RICE BULLETIN. *Commodity Series No. 11, Food and Agriculture Organization, 1201 Connecticut Avenue, N. W., Washington, D. C. Free.*

This number of the "Commodity Series" presents a complete summary of both the world rice situation and the problem of feeding that part of the Far East where rice is the most important item of diet. Any American enterprise concerned with food problems of that part of the world can profitably study this document.

Fish Dish

THE ART OF FISH COOKERY. *By Milo Miloradocich. Published by Doubleday & Co., Garden City, N. Y. 1949. 457 pages; 4¾x7½ in.; cloth. Price, $3.50.*

Here is a cook book that the fishing industry might well recommend to its consumers. It describes the infinite possibilities in the preparation of fish for use as a delicious as well as a basic food. So comprehensive is the book that one could select three recipes a week for more than eight years without repeating a single dish.

The volume actually comprises two books. It carries over 1,200 practical recipes for all types of edible fish and shellfish, whether game or commercial, salt or fresh water, fresh-caught, canned, frozen, salted, pickled, smoked or dried. There is also a course of instruction on names, seasons, forms, sizes, types and producing areas for practically all varieties of edible fish. Basic cooking information along with cooking time-charts and tables describing the best season for buying seafood are also included.

To top it all off, there are instructions on how to select, buy, and store the fish. A final chapter tells what wines to serve, their proper temperatures, and their taste and quality.

British Research

FOOD SCIENCE ABSTRACTS. *Vol 21, Nos. 1 & 2, Jan. & March, 1949. Published by Department of Scientific Research. 140 pages; 6x9½ in.; paper. For sale through His Majesty's Stationery Office, York House, Kingsway, London W. C. 2. Price 6s.*

Formerly the *Index to the Literature of Food Investigation*, these British reviews take a new lease on life under a new title. Delayed by war born difficulties, the Index had fallen behind about four years. Vols. 17 to 20 of the Index will be completed and published concurrently with the numbers under the new title.

Abstracts will be grouped under headings of meat, poultry and game; fish; dairy produce; fats and oils; fruits and vegetables; grain crops and seeds; general processes; packing methods and materials; engineering, and miscellaneous.

Government Publications

PROSPECTIVE PLANTINGS FOR 1949. *Crop Reporting Board, Bureau of Agricultural Economics. Mimeographed.* Indicates acreage of principal crops in 1949, based on March 1 reports from farmers in all parts of the country, regarding their acreage plans for the 1949 season.

HANDBOOK OF LABOR STATISTICS. *Bureau of Labor Statistics, Bulletin 916. Price 75c.* This "1947 edition" includes each major Bureau statistical series from its beginning to 1948, and also important related statistics collected by other public agencies on social security, production, income, and expenditures.

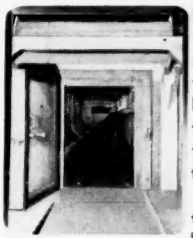
LIST OF COMMERCIAL STANDARDS, REVISED TO JANUARY 1. *National Bureau of Standards, Letter Circular LC931 (Supersedes LC911). Mimeographed.* Commercial Standards establish qual-

(Books Continued)

TWO MORE FRICK-FREEZERS FOR DEL-MAR-VA

Two big poultry freezing plants, equipped with Frick Refrigeration, were built at Salisbury and Pocomoke City, on Maryland's "Eastern Shore," in 1946.

Now Shoreland Freezers, Inc., also at Salisbury, and the Draper Canning Co., at Milton, Del., have Frick-Freezing tunnels handling fruits and vegetables.



Frick-Freezing Tunnel, Draper Canning Co.; Conveyor Belt is above Push Trucks

The Shoreland tunnel is 45 ft. long, the other 60 ft.; each is equipped with both push trucks and a conveyor belt, and will handle ANY foods.

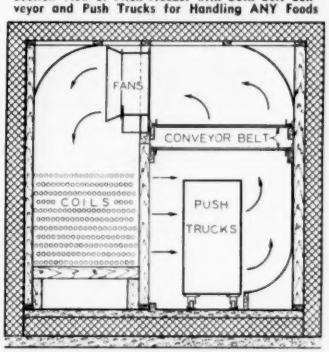
Not far away, at Bridgeton, N. J., Frick Refrigeration carries the cooling load in the world's largest quick-freezing plant.

For competent handling of that low-temperature problem of yours, look to

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA., U.S.A.

Also Builders of Power Farming and Sawmill Machinery

Section View of Frick-Freezer with Both Belt Conveyor and Push Trucks for Handling ANY Foods



How SPEED helped catch "bugs" in the lacquer

Final finish on pianos mysteriously going "sour." Production halted. Lab needed X-ray diffraction camera to identify impurity. At 9 A.M., 10-lb. camera Air Expressed from 1100 miles away, delivered by 4 P.M. *same day.* Cost, only $3.58. Company uses Air Express as routine method to get supplies fast, keep inventory low.

That low $3.58 figure was total cost for Air Express and included door-to-door service. That makes the *world's fastest* shipping method exceptionally convenient, complete, and easy to use.

Scheduled Airlines carry Air Express on every flight. Speeds up to 5 miles a minute! Direct by air to 1300 cities; air-rail for 22,000 off-airline offices. Serves many foreign countries, too.

FACTS on low Air Express rates

Package of blueprints (4 lbs.) goes 800 miles for $1.54.
Special tools (21 lbs.) go 600 miles for $3.87.
(Every kind of business finds Air Express pays.)

Only Air Express gives you all these advantages: Special pick-up and delivery *at no extra cost. You get a receipt for every shipment* and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to $50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

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Rates include pick-up and delivery door to door in all principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE
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ity requirements, methods of test, rating, certification, and labeling of commodities, and provide uniform bases for fair competition. Procedure of development is explained in a companion pamphlet entitled *Voluntary Standards Adopted by the Trade.*

FRUITS AND NUTS. *Bureau of Agricultural Economics, CS-32. Mimeographed.* First complete statistical estimate of bearing acreages for non-citrus fruit crops for all states.

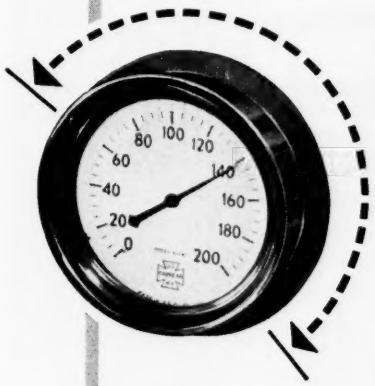
SIMPLIFIED PRACTICE RECOMMENDATIONS (Alphabetical List), REVISED TO JANUARY 1. *National Bureau of Standards, Letter Circular LC932 (Supersedes LC913). Mimeographed.* Records stock items retained after superfluous materials have been eliminated; developed by voluntary cooperation among manufacturers, distributors, consumers, and other interests as explained in *Simplified Practice, Its Purpose and Application, Letter Circular LC590 (April 15, 1940).*

DEFINITION OF pH, AND STANDARDS FOR pH MEASUREMENTS. *National Bureau of Standards, Letter Circular LG933. Mimeographed.* Measurement and control of acidity and alkalinity, in both industrial and research work, are facilitated by uniform agreement on a standard scale of pH and standard reference buffers to define fixed points on the scale.

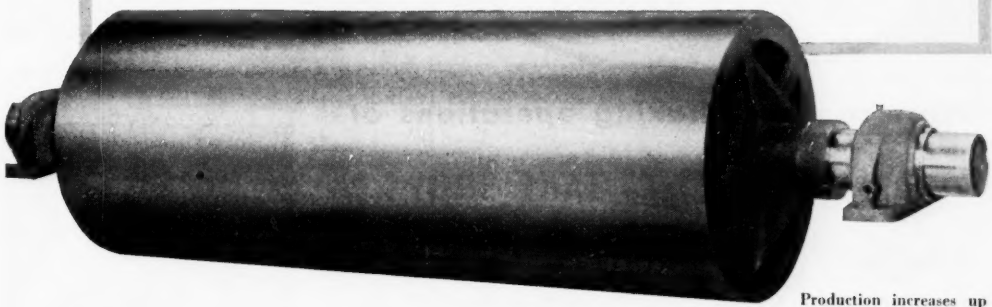
NATIONWIDE RESULTS WITH FUNGICIDES IN 1948—*Fourth Annual Report. Bureau of Plant Industry, Supplement 181 to The Plant Disease Reporter. Mimeographed.* This summary of work with 175 different fungicides on 65 kinds of plants does not represent final conclusions or imply recommendations. It is primarily for the information of those concerned with plant disease control.

SPREADS FOR BREAD. *National Military Establishment Specification JAN-S-1032, issued March 25, 1949. Mimeographed.* This specification has been approved by Departments of Army, Navy, and Air Force, and supersedes Quartermaster Corps Tentative Specification CQD 32C, without modification. Copies should be requested from Specifications Section, Chicago Quartermaster Purchasing Office, 1819 West Pershing Road, Chicago 9.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue. —*End*



safely CAN YOU WORK YOUR DRIER ROLLS AT Higher Steam Pressures?



Production increases up to 60% have been reported after Lukenweld Jacketed Steel Drier Rolls, operating at elevated temperatures, have been installed.

High pressures, possible with Lukenweld Rolls, boost output

First question to ask is, "Can our old rolls be *safely* worked at higher pressures?" Some operators report unfortunate experiences when they tried; failure of rolls damaged other rolls and shut down entire machines. Often the insurance companies will not permit any increase in pressure.

Lukenweld Drier Rolls are predictable, because they are steel plate construction. Designed for pressure work—as much as 350 psi. and over—they are SAFE. Ask your insurance company what they know about Lukenweld Drier Rolls.

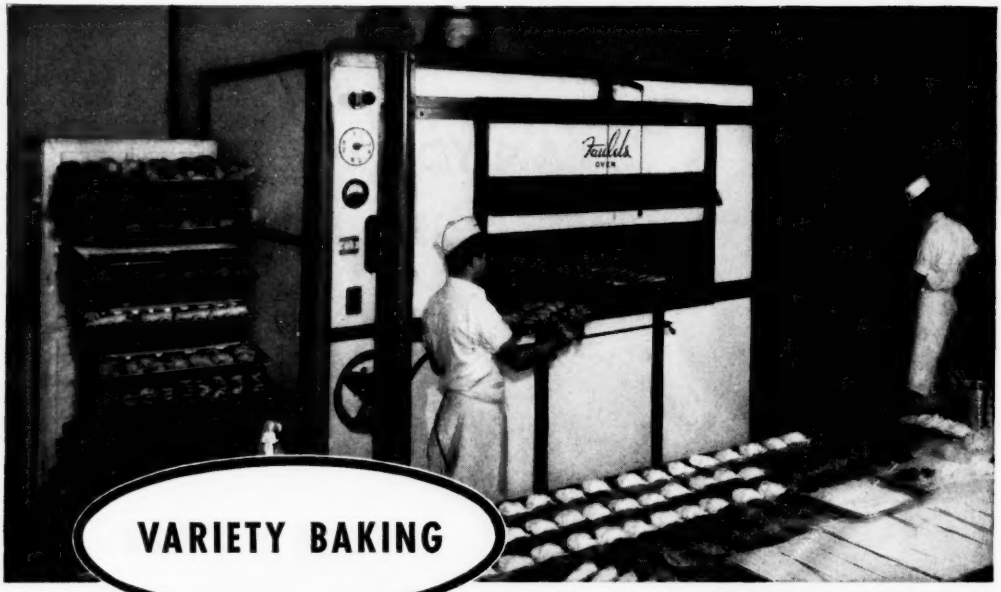
Positive removal of condensate and the higher steam velocity obtained with Lukenweld Jacketed Drier Rolls make them better workers at any steam pressure. Reduction of film, dead steam, entrapped air or other noncondensable gases contributes to their high efficiency. Temperatures are more even across roll faces.

Lukenweld Jacketed Drier Rolls are offered in diameters from two feet to over twenty feet. They are described in Bulletin 358. For a copy, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Bldg., Coatesville, Pa.

We'll lend you "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY



VARIETY BAKING

Wide range of baking operations at Federal BAKE SHOPS emphasizes versatility of GAS

LOCAL SERVICE BAKERIES catering to the variety goods demands of a large group of customers, The Federal Bake Shops supply virtually every type of baked product from staple to fancy. To supply this wide range of goods, yet operate as individual units, these local service establishments must be equipped with flexible ovens and versatile fuel.

To fulfill this need GAS and modern Gas Equipment are used in baking bread, pastries, cakes, pies, rolls. Yet Federal Bake Shops are small establishments with limited space for elaborate ovens. That's why automatically controlled GAS serves so well at any temperature and at any warm-up speed.

In a typical installation, the Federal Bake Shop in Greensburg, Pennsylvania, the Gas Equipment includes

- One Steam Box
- One Faulds Rotary Oven
- One Variety Sectional Oven

With this equipment all the products on display, and others in process, are completely finished. Manager J. C. Stuhlman describes his experience with Gas, **"We use it for all our baked goods and never have any trouble getting the right temperature at the right time. Furthermore, the simplicity of equipment maintenance, and fuel cleanliness, are mighty important in our operation."**

This flexible Gas Equipment is a big factor in baking management, large or small. It's never too early to check up on modernization of your Gas Ovens and accessories. Just call your local Gas Company today.

Gas-fired rotary and sectional ovens serve a variety of needs.

Master Baker J. C. Stuhlman, Manager of Federal Bake Shop, Greensburg, Pennsylvania.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

Patents

Diastase From Wheat Grain Products Extracted by Neutralized Aqueous Solution of Sulphite Salt.—*I. W. Tucker and A. K. Balls, Washington, D. C., to United States of America.* No. 2,457,754. Dec. 28, 1948.

Milk Packaged in Cream Separating Container—*J. P. Jones, Omaha, Neb., to Dairy Specialties, Inc., Omaha.* No. 2,457,822. Jan. 4, 1949.

Fruits Mechanically Peeled While Contained in Grooved Cups Attached to Conveyor and Mechanically Discharged From Cup at Discharge Station Leaving Peel in Cup—*H. A. Skog, Olympia, Wash., to Special Equipment Co., Portland, Ore.* No. 2,457,840. Jan. 4, 1949.

Carbonated Beverage Constituents Automatically Mixed and Deaerated in Course of Delivery to Container—*J. Kantor and E. F. Rosenberg to Liquid Carbonic Corp., Chicago.* No. 2,457,903. Jan. 4, 1949.

Fats and Fatty Oils Continuously Hydrolyzed With Water to Fatty Acids and Glycerine by Application of Heat and Pressure—*M. H. Ittner, Jersey City N. J., to Colgate-Palmolive-Peet Co.* No. 2,458,170. Jan. 4, 1949.

Citrus Peel Processed for Recovery of Acetylesterase—*E. F. Jansen, Berkeley, R. Jang, San Francisco, and L. R. MacDonnell, Oakland, Calif., to United States of America.* No. 2,458,171. Jan. 4, 1949.

Thiamin Treated With Caustic Soda and Potassium Ferricyanide in Presence of 8 Percent of Organic Material to Form Derivatives—*Kurt Warnat, Basel, Switzerland, to Hoffman-La Roche Inc., Nutley, N. J.* No. 2,458,453. Jan. 4, 1949.

Fatty Oils Refined by Treatment With Sulphuric Acid and Bleaching Earth at Between 90 and 120 Deg. C—*D. S. Bolley, Brooklyn, and E. C. Gallagher, Freeport, N. Y., to National Lead Co., New York City.* No. 2,458,554. Jan. 11, 1949.

Edible Vegetable Meal Made Free-Flowing, Oxidation-Resistant and Vitamin-Fortified—*L. O. Buxton, Maplewood, N. J., to Nopco Chemical Co.* No. 2,458,679. Jan. 11, 1949.

Vegetable Meal Impregnated to Have 50 Percent Fat Content by Weight, be Free-Flowing and Stabilized—*L. O. Buxton, Maplewood, N. J., to Nopco Chemical Co.* Nov. 2, 458,680. Jan. 11, 1949.

Asparagus Stalks and Like Mechanically Packed Into Containers—*H. E. Kelly, Los Angeles, and H. A. Howard, Seattle.* No. 2,458,858. Jan. 11, 1949.

Higher Fatty Acid Mixture, Consisting of Oleic and Linoleic Acids Substantially Free From Saturated Acids, Fractionally Separated by Extraction With Low-Boiling Aliphatic Ketone at 70 to 150 Deg. F., Chilling and Filtering—*C. C. Towne, Beacon, N. Y., to Texas Co., New York City.* No. 2,459,054. Jan. 11, 1949.

Pears Mechanically Peeled, Cored and Split—*G. A. Dunn, Oakland, Calif., to California Packing Corp., San Francisco.* No. 2,459,368. Jan. 18, 1949.

Gelled Fruits Made From Pureed Fruit Containing Crushed Fruit and Pureed Fruit Containing Sliced Fruit at Room Temperature by Addition of Powdered High-Methoxyl Pectin and Sugar—*G. Johnson, Albany, and M. M. Boggs, Berkeley, Calif., to United States of America.* No. 2,459,431. Jan. 18, 1949.

Germ Separated From Cracked Moistened Corn by Flotation in Presence of Starch Liquid—*P. A. Singer and H. J. Deobald, Peoria, Ill., to Allied Mills, Inc.* No. 2,459,548. Jan. 18, 1949.

Soy-Sauce-Type Condiment Prepared by Fermenting Sugar-Containing Solution for Development of Desired Aroma and Flavor—*R. F. Larson, R. W. Liggett and W. C. Mussulman, to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,459,563. Jan. 18, 1949.

Soy-Sauce-Type Condiment Chemically Prepared by Adding Protein Hydrolytic Products to Unfermented Chemically Prepared Liquid Flavoring Material Containing Sugar and Fermenting to Develop Desired Aroma and Flavor—*W. W. Moyer to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,459,574. Jan. 18, 1949.

Soya Oil Separated Into Fractions of Relatively Higher and Lower Iodine Values by Mixing With Non-Polar Solvent, Chilling and Centrifuging—*E. M. James, Winchester, Mass., to Lever Brothers Co.* No. 2,459,820. Jan. 25, 1949.

(Patents Continued)

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To meet these problems, we have set up definite solubility standards for Diamond Crystal Salt. Our Butter Salt, for example, dissolves completely in water at 65° F. in less than 9.8 seconds—average rate, 9.2 seconds. That is why so many quality-minded food processors have learned to depend on Diamond Crystal products, manufactured under strict quality-control standards for solubility rate.

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If salt solubility enters into your processing, write to our Technical Director. He will gladly recommend the correct Diamond Crystal Salt for best results. Diamond Crystal, Dept. J-12, St. Clair, Michigan.

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Patents

Uncooked Rhubarb Ground, Chilled to Short of Freezing, Decanted to Obtain Juice Which is Treated With Milk of Lime to Increase pH and Precipitate Acid Salts Preliminary to Filtering and Addition of Sugar—*O. C. Stout, Hamilton, Ohio. No. 2,459,901. Jan. 25, 1949.*

Chocolate Confectionery Made in Continuous Manner—*J. J. Alikonis to Paul F. Beich Co., Bloomington, Ill. No. 2,459,908. Jan. 25, 1949.*

Sirup for Making Confections Made by Diluting Cane Molasses to Predetermined Density, Bleaching, Filtering, Increasing Density by Addition of Sucrose, Inverting Sucrose Content and Again Increasing Density by Adding Sucrose—*C. C. Capdevielle, New York City. No. 2,459,991. Jan. 25, 1949.*

Proteins Acid-Digested in Presence of Water-Immiscible Aliphatic Alcohol Solvent for Tryptophane to Form Amino Acids—*R. H. Sifferd, Clarendon Hills, Ill., to Armour and Co., Chicago. No. 2,460,040. Jan. 25, 1949.*

Animal Casings Immersed and Kept in Contact With Water Through Which Oxygen Bubbles—*T. R. Ernest to Thompson Mfg. Co., Chicago. No. 2,460,077. Jan. 25, 1949.*

Frozen Foods Packaged in Containers Equipped With Telltale Indicator to Register When Temperature of Contents Rises Above Freezing Point—*K. J. Chase, Wilmington, Mass. No. 2,460,215. Jan. 25, 1949.*

Corn Milled by Method Which Includes Solvent Extraction as Step in Continuous Procedure—*W. R. Lloyd and G. H. Schafer, Chicago, to Charles A. Krause, Jr., Milwaukee, Wis. No. 2,460,389. Feb. 1, 1949.*

Soya Protein Recovered From Oil-Free Soya Meal by Treatment With Water at Isoelectric Point of Protein; Mechanically Separating Protein From Fibrous Portion of Meal; and Leaching Fibrous Portion With Alkaline Water Protein Solvent to Extract Additional Quantities of Protein—*E. O. Erkko, Wilmington, Del., and R. T. Trelfa, Kalamazoo, Mich., to Hercules Powder Co., Wilmington, Del. No. 2,460,627. Feb. 1, 1949.*

Chewing Gum Made to Have Hard Candy Characteristics and Stabilized Against Oxidative Deterioration—*E. G. Lindhe, Hastings-On-Hudson, N. Y., to Sweets Laboratories, Inc., New York City. No. 2,460,698. Feb. 1, 1949.*

Carotenoid Concentrates Made From Palm Oil—*E. W. Eckey, Wyoming, Ohio, to Procter & Gamble Co., Cincinnati. No. 2,460,796. Feb. 1, 1949.*

Gelatin Obtained From Collagen-Containing Animal Tissue by Dissolving Action of Aqueous Solution of 1 to 30 Percent Concentration of Aliphatic Amine—*R. E. Damschroder and M. E. Kauffman, to Eastman Kodak Co., Rochester, N. Y. No. 2,460,809. Feb. 8, 1949.*

Proteins Separated From Dried Skim Milk Powder by Addition of Methanol-Water Solution at About −16 Deg. C. to Precipitate Proteins and Dissolve Lactose Preliminary to Separating Protein Precipitate From Lactose-Containing Solution—*A. Leviton, Washington, D. C., to United States of America. No. 2,460,891. Feb. 8, 1949.*

Yeast Grown on Nutrient Medium Consisting of Molasses Wort and Residues From Sulphite Waste Liquor Fermentation—*Sven*

(Patents Continued)

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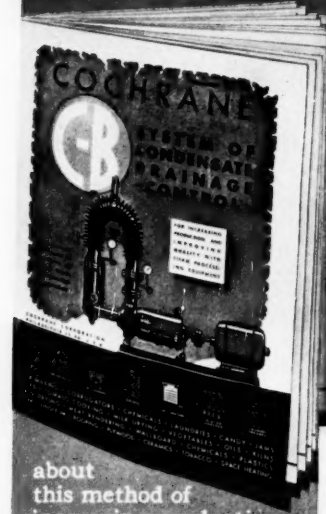

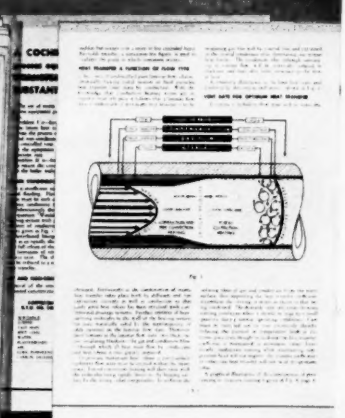

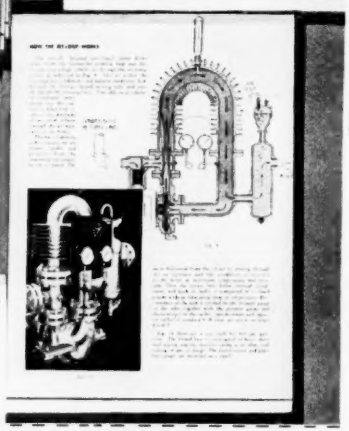

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Patents

Olof Rosenqvist, Rotebro, Sweden, to Svenska Jastfabriks Aktiebolaget. No. 2,460,947. Feb. 8, 1949.

Liquid Egg Whites Fermented With *Saccharomyces Cerevisiae* Prior to Drying—*G. Josh, Crown Point, Ind., L. A. Hartiman, Chicago, and I. W. Hopkins, Hinsdale, Ill., to Armour and Company, Chicago. No. 2,460,986. Feb. 8, 1949.*

Animal Fats Stabilized Against Rancidity by Mixing With Small Quantity of Ground Citrus Fruit Fiber, Heating to Between 100 and 200 Deg. C., and Separating Treated Fats From Spent Fibrous Portion of Citrus Fruit—*M. M. Piskur and J. W. Higgins to Swift & Co., Chicago. No. 2,461,080. Feb. 8, 1949.*

Highly Concentrated Cream Converted Into Butter by Cooling—*Hans Olaf Lindgren, Appelviken, Sweden, to Aktiebolaget Separator, Stockholm, Sweden. No. 2,461,117. Feb. 8, 1949.*

Cheese Curd Separated From Whey by Centrifuging—*G. J. Strezynski, Chicago, to De Laval Separator Co., New York City. No. 2,461,129. Feb. 8, 1949.*

Ungelatinized Starch, Water and Organic Acid Anhydride React to Form Ungelatinized Starch Derivatives—*C. G. Caldwell, Forest Hills, N. Y., to National Starch Products, Inc., New York City. No. 2,461,139. Feb. 8, 1949.*

Clarified Sucrose Solution Brought Into Intimate Contact With Bentonite at Between 150 and 200 Deg. F. to Make Invert Sugar—*W. A. La Lande, Jr., Upper Darby, Pa., to Attapulgus Clay Co., Philadelphia. No. 2,461,163. Feb. 8, 1949.*

Thinly Sliced Beef Smoked and Dried While Held Between Perforated Sheets or Plates to Prevent Curling—*H. H. McKee to Swift & Co., Chicago. No. 2,461,291. Feb. 8, 1949.*

Packaged Foods Frozen During Movement by Successive Stages Through Vat Containing Refrigerant—*K. Ettihios, New Orleans, La. No. 2,461,375. Feb. 8, 1949.*

Chocolate-Coated Candies Having Semi-Liquid to Liquid Centers Made to Have Projecting Top Portion With Greater Wall Thickness Than Remainder of Shell—*H. Strausser, New York City. No. 2,461,399. Feb. 8, 1949.*

Protein-Containing Seeds Impregnated With Dilute Aqueous Solution of Sulphuric, Hydrochloric or Phosphoric Acid Preparatory to Extraction of Protein Content—*R. L. Wormell and A. F. Millidge, Coventry, and C. L. Knight, Kenilworth, England, to Courtaulds, Ltd., London, England. No. 2,461,404. Feb. 8, 1949.*

Bakery Doughs Made in Refrigerated Mixer—*M. A. Sticelber, Kansas City, Mo., to Quik-Seal, Inc. No. 2,461,459. Feb. 8, 1949.*

Meat Protected Against Deleterious Photo-Chemical Action by Color Screen Having Spectral Transmission of Substantially All Light Between 4,900 and 6,300 Angstrom Unit Wave Lengths—*M. R. Coe, Washington, D. C., to Rile-Coe Filter Process, Inc., Pinehurst, N. C. No. 2,461,522. Feb. 15, 1949.*

Frozen Foods Packed in Preset Pressure Can—*R. Lo Vico, Astoria, Long Island, N. Y. No. 2,461,557. Feb. 15, 1949.*

—*End*

FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

$127.50 Monthly Profit from Orange Oil Formerly Lost

(reported by J-M Engineer H. G. Martin)

LOS ANGELES DISTRICT: A citrus processor in my territory uses high-speed centrifuges for orange oil recovery. After two weeks' operation, there is an accumulation of about 100 gallons of sludge, which has a high content of orange oil. Settling and decanting this sludge yields 75 gallons of oil. By adding Celite to the remaining 25 gallons of heavy sludge formerly discarded and then pressing it, 5 more gallons of orange oil are recovered. Selling for $1.50 per pound, this means a saving of $130.00 in additional orange oil per month. Deducting $2.50 for the cost of Celite used, the operation shows a monthly net profit of $127.50.

Sales Appeal Improved with Celite 545

(reported by J-M Eng. W. A. Reschke)

CHICAGO DISTRICT: A trial run convinced this customer that he had much to gain and nothing to lose by using Celite as a pressing aid in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Previously, without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. Customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a considerably longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite 545 to each 900-lb. batch of grapes pressed.

Filter Trouble Corrected with Hyflo*

(reported by J-M Engineer R. J. Amberg)

DETROIT DISTRICT: A wine company reported trouble with a new filter which they had installed recently and I was called in to assist.

The problem was to handle the settlings from several thousand gallons of wine without increasing the amount of filter aid which they had been using. The wine is pumped from the main cask to a 260-gallon mixing tank and from there to the filter. There are no facilities for pre-coating with anything but unfiltered wine. We put ten pounds of Hyflo in 200 gallons of wine in the mixing tank and circulated this until clarity was obtained. This was a matter of only a few minutes. The clear filtrate was then turned to a receiving tank. The flow rate was estimated at 6 gallons per square foot of filter area per hour after filtering about 200 gallons.

*T. M. Reg. U. S. Pat. Off.

Engineering Help Solves Filtration Problem

(reported by J-M Engineer G. F. Huber)

BOSTON DISTRICT: One of my customers was having difficulty due to the filter powder coming through the ceramic filter medium. I checked the operation with their technical director and found that incomplete venting of the air from the filter body during precoating permitted air to remain trapped in the upper part of the filter. This prevented the precoat suspension from filling the filter and depositing an even coat upon the stone. As the filtration was continued, the liquid level in the filter rose and gradually displaced the air but meanwhile, of course, some filter aid passed through the stone.

I suggested complete air venting at the start of the precoating and installing a valve on the outlet side. This change in operation resulted in a decided improvement and, needless to say, the customer was greatly pleased.

Your New Problem may be an old one to the CELITE Engineer

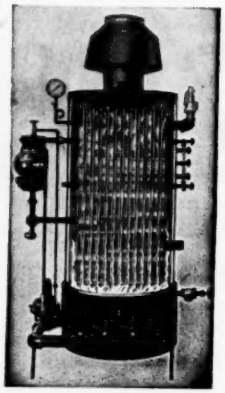
These case histories show not only what Celite Filter Aids can do but also how Johns-Manville Filtration Engineers can help you. Small, simple changes in equipment or technique often lead to big results because J-M Engineers combine scientific knowledge with wide practical experience on many filtration problems. In addition, they have access to the resources of the J-M Research Laboratory where modern filtering techniques and filter aids were developed.

For additional information, write Johns-Manville, Box 290, New York 16, New York.

Johns-Manville JM PRODUCTS

***Celite* Filter Aids**

Reg. U. S. Pat. Off.



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How Not To Operate A Plant

—*Continued from page* 41

variety of pie made. There is no careful record of how much material goes into the pies.

Suppose that check-up were made every week. Then, if the weights of materials used were on the high side, the overage would be attributed to overweighing. However, if the production department reports the use of normal or slightly below normal weights, then other reasons must be sought to explain the excessive use of materials—whether it is due to breakage, spillage, spoilage, or pilferage.

If the production department cannot justify the loss, a recheck should be made for possible error. Perhaps the sugar sirup meter was air-bound and registered a high usage. In that case, the gages at the sirup tank should be examined.

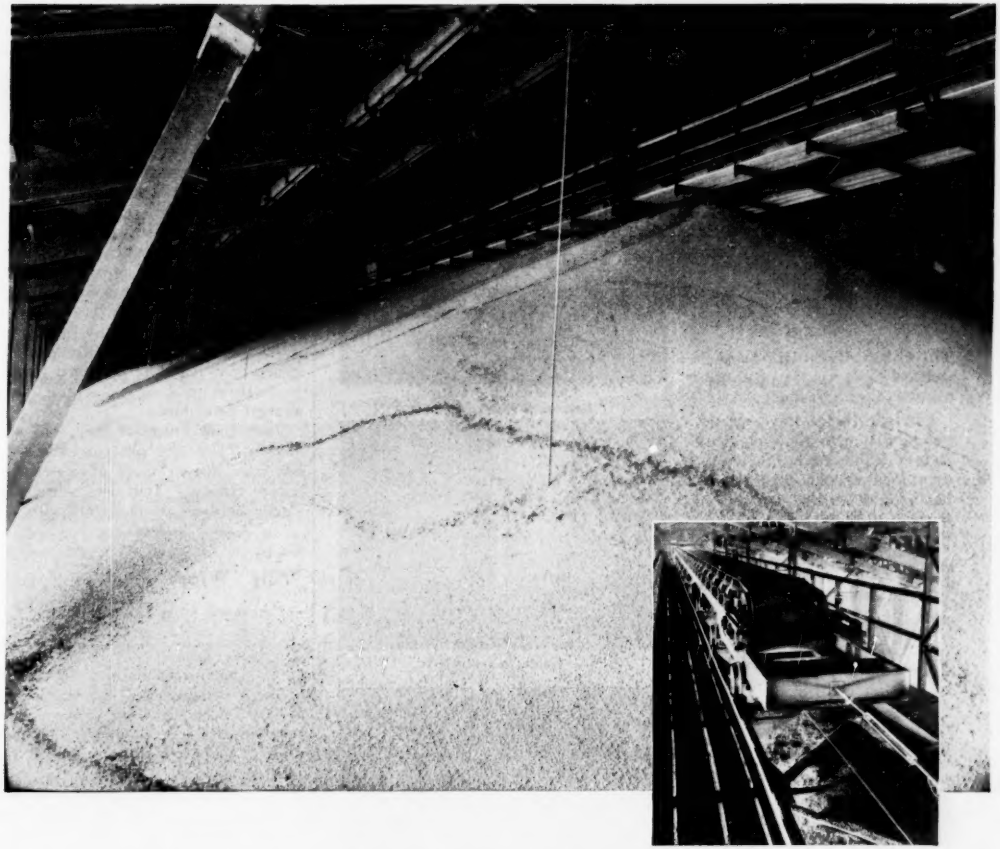
Other errors might be attributed to setting the automatic flour scale inaccurately. Or, the apples may be excessively bruised. Also, the apple-paring machines may be trimming on the heavy side due to improper adjustment. Too, the farmer may be packing bushels light. Instead of the apples weighing 45 lb. to the bushel, they may weigh only 43 lb.

Considerable money could be saved by this firm if it were to constantly spot-check incoming raw materials for correct weights and quality.

Faulty supply control also can muddle operations. Diagnosis at one "sick" bakery was "lack of proper tie-in between the purchasing, sales, receiving, and production departments." Often, the receiving department stockman had neglected to advise purchasing when supplies were running short. When this happened, production couldn't meet orders. Then again, the purchasing department did not always buy quality raw materials at a low price in season. Instead, high prices had to be paid for materials short in supply.

Still another company is lax in not using a requisition system. Workers in the dough mixing department and the kitchen simply help themselves to ingredients in stock. Consequently, there is no precise correlation between the amount of raw materials used and the finished product. And as a result, there is no accurate way of determining yields and calculating costs.

Here is one way to set up a simple yet effective requisition system: First, the salesmen list their orders on order sheets, and a clerk summarizes them on production sheets that are issued to the sales and production managers. The production manager then checks



MAKING A MOUNTAIN Out of Soybeans

This smooth-working, large volume conveying system designed by S-A engineers piles "A mountain of soybeans" almost to the roof using the entire enclosed area 530′ x 100′ in two buildings. That's *maximum* storage!

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DRACKETT COMPANY
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Maximum utilization of soybean storage space in two buildings, each 265 ft. long is accomplished here with an S-A designed system built just under the roof. One 240 ft. long shuttle belt conveyer with 30" wide belt can be operated in either direction so it can discharge soybeans at any point down the entire length of both buildings. This S-A Conveyor System handles 4400 bushels of soybeans per hour.

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DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

How Central Soya Company

(Gibson City, Ill., Plant)

Controls Dust From Soy Beans

Grain trap and fan unit for storage tunnel and gallery.

The Gibson City, Ill., plant of Central Soya Co. is up-to-the-minute in every respect.

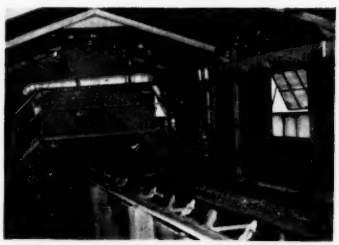
Efficiency, economy and dependability were the governing factors in selection of all equipment for this large plant, which has a total storage capacity of three million bushels.

That is why

DAY Dust Control Systems

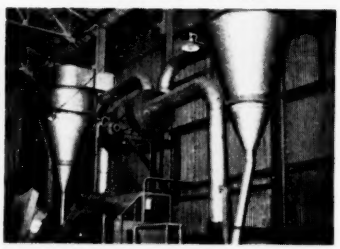
were selected. **DAY** systems control dust from the car dumper unit, belt transfer points, elevator boots and heads, belt loading spouts, house storage bins and bean distributors. In addition, each gallery tripper is equipped with a **DAY** tripper assembly for controlling the dust when filling the storage bins. **DAY** floor sweeps are conveniently located so that sweepings can be pneumatically conveyed to the dust bins.

Typical floor sweep.



Dust Control on gallery tripper.

"We like the **DAY** Systems and believe them to be efficient," states Mr. Tom Allwein, plant manager.



Car dumper dust control unit

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Branch Plants in Fort Worth, Buffalo and Welland, Ontario

with the sales manager to determine if the production called for is accurate. Salesmen may have over-ordered, or perhaps top management may decide to cut down on the production because weather reports predict high temperatures.

Finally, production makes out a materials requisition list which is turned over to the receiving department, and materials are issued to the scaling room, where they are weighed out and distributed to the various departments.

Every one of the above-mentioned ills of omission or commission has been observed plaguing this or that bakery—with a decidedly adverse effect upon the respective company ledgers. And in summary it might be reasoned that a food operation is only as strong as its weakest procedure.

Each food processor may well ask himself, "Does my plant likewise suffer from one or more of these procedure viruses[" If it does, something should be done about it forthwith.

—End—

"Poly" Wrap

—Continued from page 49

in excellent condition and showed no evidence of brown ring formation.

The use of the combination of low moisture-vapor transmission and high carbon dioxide transmission properties of polyethylene film in packaging is demonstrated by the storage of roasted coffee beans. When stored, roasted coffee liberates gas—mostly carbon dioxide.

Roasted coffee beans, in 1- and 2-lb. packages, were stored for one year at room temperature. At the end of that time, the moisture content of the bean was such that the grinding quality of the bean was good. Coffee prepared from these beans compared favorably with coffee made from a sample of the beans stored under vacuum.

In packaging dried seeds (beans, corn, and similar materials), the high oxygen and carbon dioxide transmission and the low moisture-vapor transmission of polyethylene film is used to advantage. These properties have also been applied to refrigerated storage of such consumer goods as lettuce, cabbage, celery, and beans.

Dried seeds were sealed in polyethylene bags to give approximately 1-lb. units. The dried seed is a biological entity which "breathes-in" small amounts of oxygen and releases carbon dioxide in storage. Because of its low moisture-vapor transmission, the film kept the moisture content of the seeds well below 12 percent. Here, too, the influence of surface/volume relation-

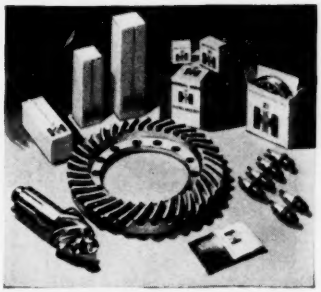
First in heavy-duty truck sales for 17 straight years!

1. Rated first in value by America's most exacting truck buyers!

For 17 straight years, registration figures for new trucks with gross weight ratings over 16,000 lbs. have shown International Trucks in first place. Would America's most exacting truck buyers have given Internationals that vote of confidence unless they knew Internationals were the best value in the heavy-duty truck field?

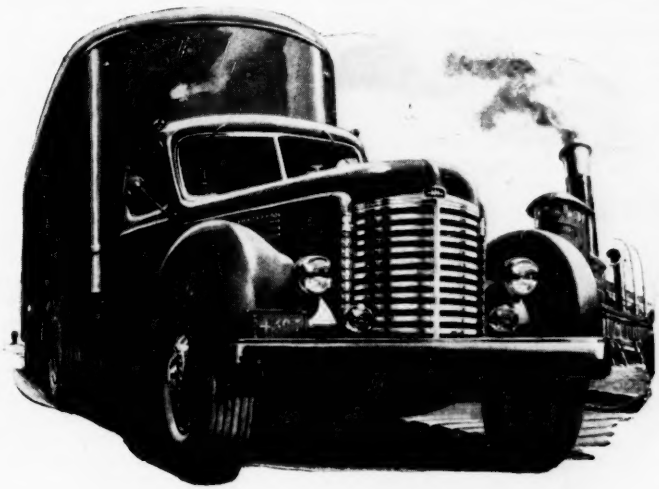
2. Backed up by the nation's largest exclusive truck service organization!

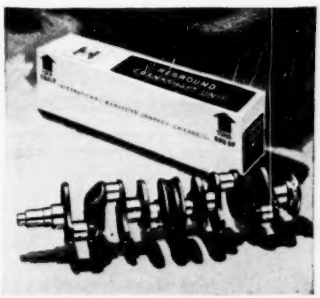
4,700 International Truck Dealers and 170 Company-owned Branches and Service Stations stand ready to keep International heavy-duty trucks operating at peak efficiency. Factory-trained mechanics and special tools are on hand to give International Trucks the diagnosis, service, testing and repairs to correct any trouble.



3. Precision-engineered parts help keep the leader leading!

Replacement parts have a place on the all 'round truck team that keeps Internationals ahead of the field. They're precision-engineered parts, just like the originals. They're made to fit and do a better job and last longer. Ample inventories of parts and approved accessories are available at all Dealers and Branches.





4. Inexpensive factory-rebuilt exchange units are important, too!

Owners of heavy-duty International Trucks also save money on crankshafts, clutches, carburetors, transmissions, differentials, brake shoes and electrical equipment. Complete International units, reconditioned and factory-rebuilt, are priced way below new ones and covered by new unit International warranty.

5. You don't stay first in sales for 17 straight years unless you're first in value!

No matter what model International Truck you buy—heavy, light or medium-duty—you get the same basic values that have made International Trucks first in the heavy-duty truck field for 17 straight years.

You get a rugged truck that hasn't been weakened by a single compromise with passenger car engineering.

You get a truck specialized to meet your particular requirements by truck engineers. You have 22 basic International Truck models and 1,000 truck combinations to choose from.

For real truck value, see your nearest International Truck Dealer or Branch before you buy any truck.

International Harvester Builds
McCormick Farm Equipment . . . Farmall Tractors
Motor Trucks . . . Industrial Power
Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars"
NBC, Sunday afternoons

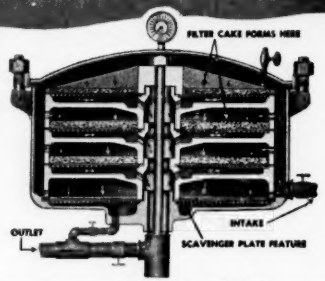
INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY • CHICAGO

FOR HIGH SPEED, UNIFORM FILTRATION REQUIRED IN FOOD PROCESSING

SPARKLER horizontal plate FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



HERE ARE A FEW FOOD PRODUCTS THAT SPARKLER FILTERS HANDLE WITH EASE:
Candy Scrap
Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
Gums
Liquors
Milk
Molasses
Vegetable Oil
Syrups
Vinegars
Wines
Fruit Juices
Alcohols
Alkalies
Beverages

Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

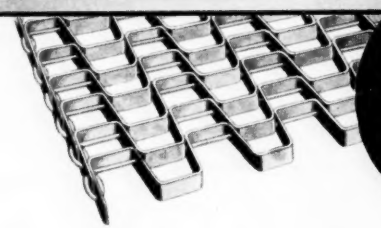
Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems. You will receive the advice of filtration engineers with over a quarter of a century experience in a specific field.

SPARKLER MANUFACTURING COMPANY
MUNDELEIN, ILLINOIS

The ONE Conveyor Belt for Every Process . . .



LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

If your process is canning, pickling, preserving, dehydrating, cold packing or hot packing, a La Porte Belt is the most efficient and economical belt for you. Its rugged steel construction resists impacts, wear, heat, cold and rust. It is easily sterilized with steam or scalding water. It will not stretch, creep, weave nor jump. And its open mesh feature, that permits circulation of water, air or heat around products in process, makes it readily adaptable to scalders, washers and cookers.

The flat, even surface safeguards and speeds up handling of tin, glass or paper containers as well as corrugated shipping boxes. It is long wearing and requires little maintenance. Available in any length and practically any width. *Write at once for literature and price—no obligation.*

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

ships is of great importance, and requires careful study for individual products.

Frozen Food Packaging

Flexibility during prolonged low temperature storage makes polyethylene film an excellent wrapper for frozen poultry. Dressed chickens and ducks have been stored six months in deep-freeze compartments using commercial handling methods. After this period, the poultry was in excellent condition and the wrappers were still intact. With this type of film, freezer burns were reduced to a minimum.

In many applications for frozen or fresh meats, the requirements for a moistureproof wrapper are readily met with polyethylene film. An excellent example is the wrapping of fresh livers for pharmaceutical purposes.

Fresh livers usually drip considerably. This drip contains many soluble components that are desirable in the preparation of pharmaceuticals.

Packaging of livers in polyethylene film for storage facilitates handling. Bags are prepared by string-tying the desired length of tubular film. The package can then be frozen and shipped in a supporting cardboard container.

An interesting feature of polyethylene film is its ability to transmit or to retard the transmission of certain odors. A list of the transmission of certain essential oils through this film is given in Table IV. Values are for the purified oils. Undoubtedly the rates are lower for packaged food products.

The aroma arising from a package of orange drink powder is appealing and aids in identifying the product. On the other hand, retarding odor emission is useful in the refrigerated storage of fish fillets. Amines and other substances responsible for fish-odor are not transmitted through the film. Polyethylene-packaged fish can be handled and stored in the consumer icebox without the usual transmission of fish odor to other products.

To Sum It Up

Thus, the use of polyethylene film for food packaging has been demonstrated by presenting packaging problems in which the particular physical characteristics of the film are utilized to advantage.

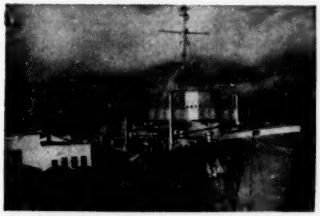
In all packaging problems, consideration must be given to the composition of the materials to be packaged, the manner and duration of storage, and the type of handling encountered—and particularly to the characteristics of the food wrapper in order to arrive at the proper choice of a packaging material. *—End*

WORTHINGTON

REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

Specialists in air conditioning and refrigeration for more than 50 years



Motorship "Saipan", operated by Columbia River Packers Association as "freezer ship" for tuna fleet.

What To Take On A Fishing Trip

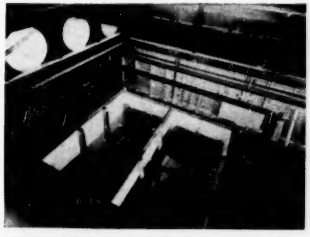
"Saipan" and "Tinian" are the memory-provoking names of two refrigeration vessels which are helping to revolutionize the tuna industry.

The idea is to relieve the fishing vessels of duty as carriers and permit them to concentrate on fishing. The "floating ice boxes" accompany the fleet and freeze the catch on the spot.

These carriers, operated by Columbia River Packers Association, are the largest engaged in this work.

Freezing is accomplished in a 75-ton capacity brine tank in which covered galvanized steel baskets, each containing 1250 lb of fish, are stacked. Brine is pumped through banks of ammonia coil. The coiling is especially heavy in order to provide effective cooling in tropical temperatures. 75 tons of tuna are frozen in 24 hours.

The refrigeration is provided by four 8" x 8" vertical Worthington Compressors, working through a single-stage compression system.



View of freezing tank, showing exceptionally heavy coiling.

We Keep It 40 Below By The Stillaguamish

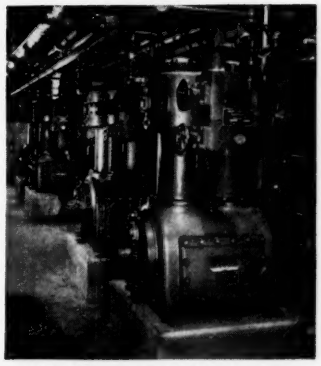
On the rich lowlands formed by the Stillaguamish River which runs by East Stanwood, Wash., is an immense acreage planted in strawberries, raspberries, peas and corn.

Here, in "the heart of the harvest", Pictsweet Foods Inc. built its quick-freezing plant, so as to preserve "peak of crop" freshness.

To service two large freezing tunnels, Pictsweet built a 1200 hp refrigeration compressor room, housing fifteen compressors. The temperature in these tunnels must be kept very low, so the compressors must maintain temperatures as low as -40 F.

It requires two stages to pump heat from this low temperature, and five Worthington 6HA6 Ammonia Booster Compressors are installed for the first step. These Worthington units pump the low pressure gas directly from the evaporator coils in the tunnels and compress it for the last stage units including Worthington 10 x 10 Vertical Ammonia Compressors.

Five Worthington Ammonia Booster Compressors used for quick-freezing.



Worthington Vertical Compressors at Quincy Market Cold Storage & Warehouse Co., Watertown, Mass.

30 Miles of Brine

The largest frozen food storage plant in New England—the plant operated by Quincy Market Cold Storage & Warehouse Co. — depends upon Worthington refrigeration equipment to maintain room temperature at minus 10F and a constantly high humidity.

Refrigeration for brine which travels through 165,000 ft of 2 in. pipe (roughly 30 miles), is supplied through four Worthington 10 x 10 vertical single-acting ammonia compressors, each driven by a 140 hp Diesel engine and operating from 200 to 400 rpm. They are equipped with 16 in. x 14 in. horizontal condensers.

All four compressors can be used at once for brine cooling or two can be diverted to quick-freeze rooms which are piped for direct expansion.

These compressors include such important features as Worthington Feather* Valves (simplest, most durable ever made) for both suction and discharge, unit-type manifold with quick-opening relief valve, water-jacketed cylinders, forged steel crankshafts and connecting rods.

Other Worthington equipment includes one 38 in. x 16 in. receiver and two 34 in. x 18 in. brine coolers.

Engineers: Ganteaume & McMullen, Boston.
*U. S. Reg. Pat.

AB-9

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

A complete line . . . in which *all* the vital components are *made*, not just assembled by Worthington. For *more worth with Worthington*, see your nearby Worthington distributor (consult Classified Telephone Directory).

VIKING PUMP
PRODUCTION CAPACITY EXPANDED

NOW! BETTER SERVICE to YOU

NEW ADDITION OPERATING

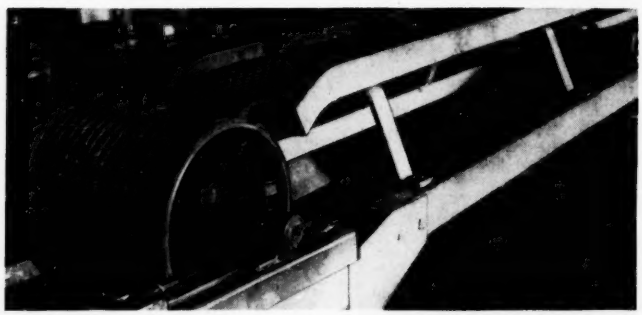
Now you can have better and faster service, when you order Viking Pumps, because a large new addition to the plant is in full operation. Now production is stepped up so you can depend upon quick delivery whatever type of Viking Pump you want.

To those who have waited for their Viking Pumps, we wish to express our thanks and appreciation. To those who couldn't wait, we want you to know that there is no need now to accept substitutes of any kind. For latest information on Vikings, ask for free Bulletin 100E.

VIKING
AN HONORED NAME IN PUMPING

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa



A Cyclone Metal Conveyor Belt

Nothing Like It

● No two conveyor setups are alike. Each calls for different belt styles . . . different metals, alloys, finishes, mesh and wire size . . . or different engineering to meet specifications of the particular job.

Cyclone Metal Conveyor Belts are available in three basic styles, Flat-Wire (illustrated), Chain Link and Flex-Grid. Each style is offered in a range of materials and sizes. And Cyclone engineers call on 25 years' experience in metal belt design and manufacture to meet the problems of unusual installations. That's why Cyclone can fit your conveyor requirements.

Turn *your* conveyor problems over to experienced Cyclone engineers. They'll select or design a Cyclone Metal Conveyor Belt that fits your job in every respect. Contact your nearest Cyclone office . . . they're in most principal cities . . . or write for Catalog No. 4.

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
DEPT. H-69, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

Marketing Leadership

—*Continued from page 77*

pineapple and began a new trend in food advertising by the pictorialization in color of pineapple recipes. Two other canners, besides Dole, were now doing supplementary advertising of their brands of pineapple.

The Pineapple Producers Cooperative Association, besides handling the cooperative advertising program, also acted as an agency to prevent overproduction of canned pineapple. It may be noted here that the PPCA was dissolved, twelve years later, in March 1944, eliminating all marketing agreements, quotas, etc. In fact, the companies' quotas were actually meaningless and inoperative for many years prior to 1944.

"Drink Your Fruit Instead of Eating It"

For a number of years, the company had offered an unclarified canned pineapple juice to consumers. It then was considered as a by-product. Consumer acceptance of this juice was very poor —amounting to less than 1 percent of the company's total sales. Confident that this product would become a good adjunct to canned pineapple products, the company pushed research on it. In 1932, the researchers developed a new processing technic in which, among other unit operations, the unclarified juice was clarified by centrifuging.

Coincidentally, mainland packers put their new orange and tomato juice products on the market. This marked a new era in the canning of fruit and vegetable products, and Dole pineapple juice was soon to become the dominant fruit juice on the market.

Juice Joins Ad Parade

Fortunately pineapple juice was not included in the cooperative marketing agreement established with the Association. It was decided that, since no obligations to buyers were entailed in this new product, the company would use it as the entering wedge in markets to establish the newly designed Dole label. The company was now moving toward the culmination of its long-range program—that of making its own label dominant in the canned pineapple field.

Under an advertising manager, a sales and advertising program, utilizing color, was planned. In 1933, Dole began to advertise all its pineapple products. The main feature of this advertising was pineapple juice. Largely confined to national magazines, it featured not only the goodness of the product but began to glamorize the source of both juice and pineapple.

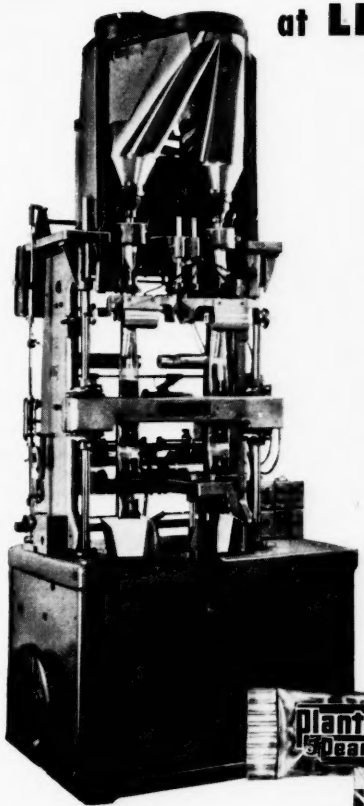
The can-top advertising, which had

TRANSWRAP

THIS READY-MADE
BAG, HAND-FILLED
Approximate Cost
Labor and Materials
$7.00 per thousand

THIS *AUTOMATIC*
TRANSWRAP PACKAGE
Approximate Cost
Labor and Materials
$3.29 per thousand

AUTOMATICALLY produces a better-selling package at LESS than HALF THE COST



TRANSWRAP—industry's most practical and efficient packaging machine—forms, fills, seals and delivers a better-looking, better-selling package for your product. . . completely automatically.

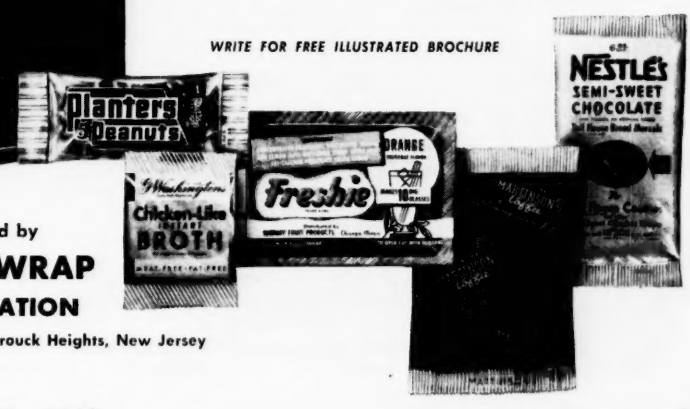
In cost, the *finished filled* TRANSWRAP units actually run less than half the price of ready-made *empty* bags for manual processing. And, because a single operator can handle a whole battery of TRANSWRAP machines, wage savings are phenomenal.

TRANSWRAP is equally efficient for powders, solids, tablets and even liquids. Standard packaging materials which may be used include cellophane, Pliofilm, glassine, roll foil or other suitable heat-sealing materials. Package capacities range up to 80 cubic inches in volume and often may exceed one pound in weight. Custom-engineered adaptations are possible to meet your individual requirements with maximum efficiency.

Model "B" Transwrap with auger feed. Also adaptable to Volumetric or liquid feed. Produces 40 to 75 pkgs. per minute.

Also Available—
Model "A" Transwrap
For small and unit packages.
(2⅜" x 6" Max.) Speeds to
150 pkg/min.

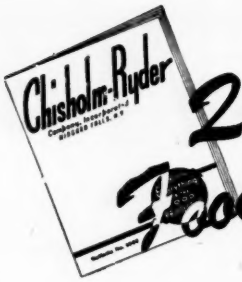
WRITE FOR FREE ILLUSTRATED BROCHURE



Manufactured and Sold by

TRANSPARENT WRAP MACHINE CORPORATION

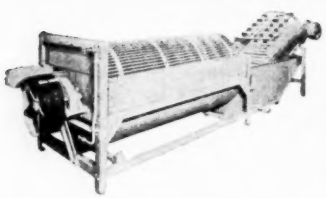
Route 17 and Henry Street, Hasbrouck Heights, New Jersey



Quality Food Processing

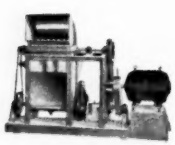
On the Tomato Line at Lower Operating Cost with CRCO

Tomato juice lines equipped thruout with CRCO labor-saving machines insure maximum production with lower labor costs—spelling additional profit for the processor. Each CRCO unit in the line is designed for 15-ton capacity or greater.



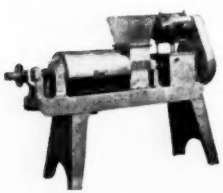
CRCO TOMATO WASHER

Has large hot or cold water soaking tank with variable speed control, in which a s spiral gently tumbles the tomatoes to loosen mud—a roller-conveyor lifts the product, constantly turning each individual tomato as it passes through a high-pressure water spray which removes all mud, mold and soft spots. Can handle 20 tons per hour.



CRCO FORCE-FEED CHOPPER PUMP

The best and most sanitary method of cutting tomatoes for pre-heating and extracting. Tomatoes pass through a battery of cutting knives and the pieces and juice drop into a stainless steel tank where a worm-feed carries them to a CRCO Sanitary Pump which forces the product to the pre-heater.



CRCO JUICE EXTRACTOR

The most improved and efficient Extractor made! Has the exclusive screw and screen design with adjustment which permits a dry pomace with all pulp removed from seed and skins. This insures maximum retention of full flavor and color as well as complete recovery of juice.

THE BEST OF Everything

CHISHOLM-RYDER CO. INC.

Niagara Falls, New York

FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania AN AFFILIATE

Ayars Machine Company A SUBSIDIARY

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familiarized consumers with the Dole name by instilling the thought that "Dole" meant quality—no matter what label was on the can—had built an unusual foundation for the introduction of the new label. Within the first ten years after its introduction, the juice pack reached a production position of equal importance to the entire line of solid pack pineapple items. In the years 1940–41, the total pack of pineapple juice amounted to over 1,000,000 cases more than the solid pack product. The development of pineapple Gems, or Chunks, in 1934, made no significant impression, so great was the reception of the juice.

Produced by an exclusive process, the juice rode on the popular wave of fruit and vegetable juice sales.

Other pineapple companies were to capitalize on this later and to swell the production of juice. Dole's net sales income rose from the low point in 1932 to a new record in 1936–37 of $21,500,000, and it was destined to reach even higher records.

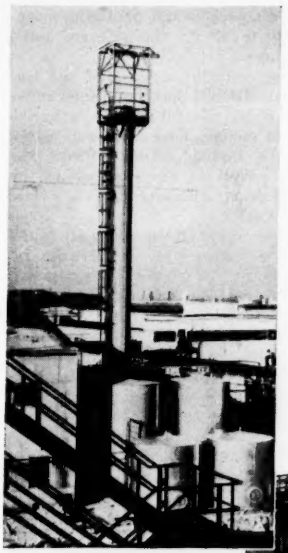
In addition, pineapple juice acts as a form of insurance that all pineapples of good quality, no matter what size, can be utilized. Fruit used for canning must be of a certain diameter so it can be cut to required sizes for the No. 2 or 2½ cans. But, growing seasons vary. Some produce a more or less uniformly large fruit, while poor seasons produce sizes lacking in uniformity—sometimes with a significant proportion of small fruit. Much of this small fruit is used for pineapple juice. Juice is also obtained from other unit operations in the process where the fruit is cut.

Gain National Distribution

Largely on the spectacular consumer acceptance of Dole pineapple juice, the company had secured distribution of its products in all the nation's major centers and most of the lesser marketing areas by 1937. The sales department had now developed a nationwide organization comprised of 100 food-broker firms, strategically located.

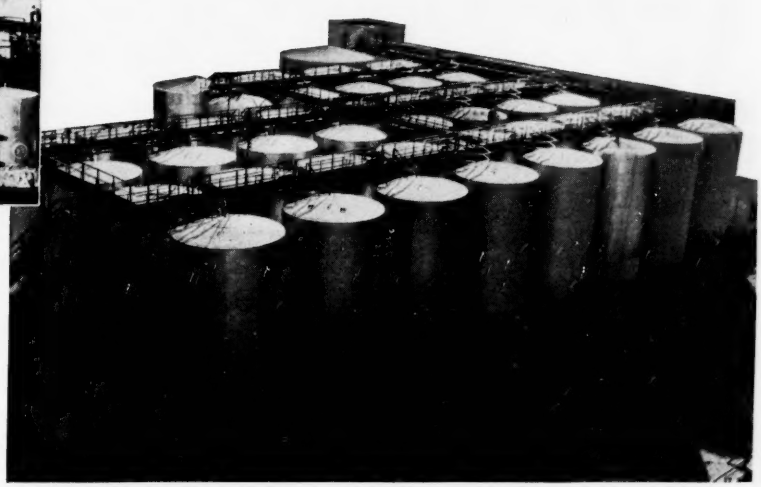
In addition to brokers, the company now has a crew of divisional sales managers, whose work consists largely of merchandising Dole products by coordinating the sales and promotional efforts of brokers, jobbers and retailers. Net sales income for 1947–48 totaled nearly $34,000,000 and, from all indications, the consumer demand for pineapple is not yet lessening.

Another impetus to current consumer demand for canned pineapple came during World War II, when the Armed Forces took as much as 60 percent of all the production. Many who had never before tasted pineapple consumed it while in military service, thus increasing consumer awareness. This heavy demand also depleted all exist-



Lukens Stainless-Clad Steel was used by Blaw-Knox Company in fabricating this fat-splitting column for Swift & Company.

Glycerides and fatty acids PROTECTED by Stainless-Clad Steel



Some of these storage tanks, and preparation tanks inside the plant, are Lukens Stainless-Clad Steel; built by General American Transportation Corporation.

in Swift's new plant

To utilize raw materials from its many plants, Swift & Company recently put this new industrial oil processing plant into production at Hammond, Indiana. Many of its products go into cosmetics, toilet creams, soaps and similar items, so protection against metallic contamination is vital. Lukens Stainless-Clad Steel helps provide that protection.

Fat splitting is done in a continuous, high-temperature hydrolysis unit, producing fatty acids which are high in quality and light in color. Since they come in contact with only the stainless steel interior surfaces of the clad steel tower, preparation and storage tanks, there's no metallic contamination to affect them.

Lukens Clad Steels—Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad—offer you the protection of these *solid* corrosion-resistant metals with the economies of *clad* steels.

In each, a uniform thickness of the cladding material, usually 10% or 20% of total plate thickness, is permanently bonded to a steel backing plate. The extra-smooth sodium hydride finish makes equipment extra easy to keep clean.

Bulletins 255 and 338 tell you more about Lukens Clad Steels. For copies, write Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

CLAD METAL STEEL

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

Why use Old-Fashioned
Spice-Flavoring Methods when you can use

MM&R SPICE OILS, the MODERN Method of FLAVOR CONTROL

Through the use of modern, concentrated liquid Spice Essential Oils, the progressive food packer is cutting costs not only on materials-handling . . . but on shipping and storage as well. For liquid spice oils are far less bulky than the equivalent crude spices!

In addition, 100% pure MM&R Spice Essential Oils (that have not been diluted with wetting agents) work vital improvements in product *quality* . . . because they offer the utmost in uniformity, flavor content, and purity you can *count* on. For a quick summary of the reasons why MM&R Spice Essential Oils are *truly essential*, see panel at right.

11 Reasons why you should use MM&R SPICE ESSENTIAL OILS

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. Free from bacteria
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for complete information and "Table of Equivalents" showing comparative flavoring strengths of whole spices and spice oils.

MAGNUS, MABEE & REYNARD, INC.

SINCE 1895... ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK 13, N.Y. • 221 NORTH LA SALLE STREET, CHICAGO 1, ILL.

LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS AND ROGERS, INC.
SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

ing stocks of Dole pineapple and juice. The company is still producing at capacity to fill its wholesale and retail pipelines.

The exotic background of the Hawaiian Islands has been interwoven into Dole's colorful advertising by the use of pictures done in Hawaii by the world's leading artists. Stress has been placed on recipes developed by the company's home economists in their own kitchen.

These recipes, or use-suggestions, all of which include pineapple, also require other ingredients or foods, aiding in the retail sale of related items. From the psychological standpoint, advertising copy and illustrations are designed to stimulate consumers' appetites for the product, and are not the conventional "reason why" ads.

The colors selected strike between the subdued and bright range, the main effort being placed on reproductions as close to natural colors of the foods as possible.

For three years (1938-39-40), the company used a limited radio program, but presently all advertising is scheduled for national magazines.

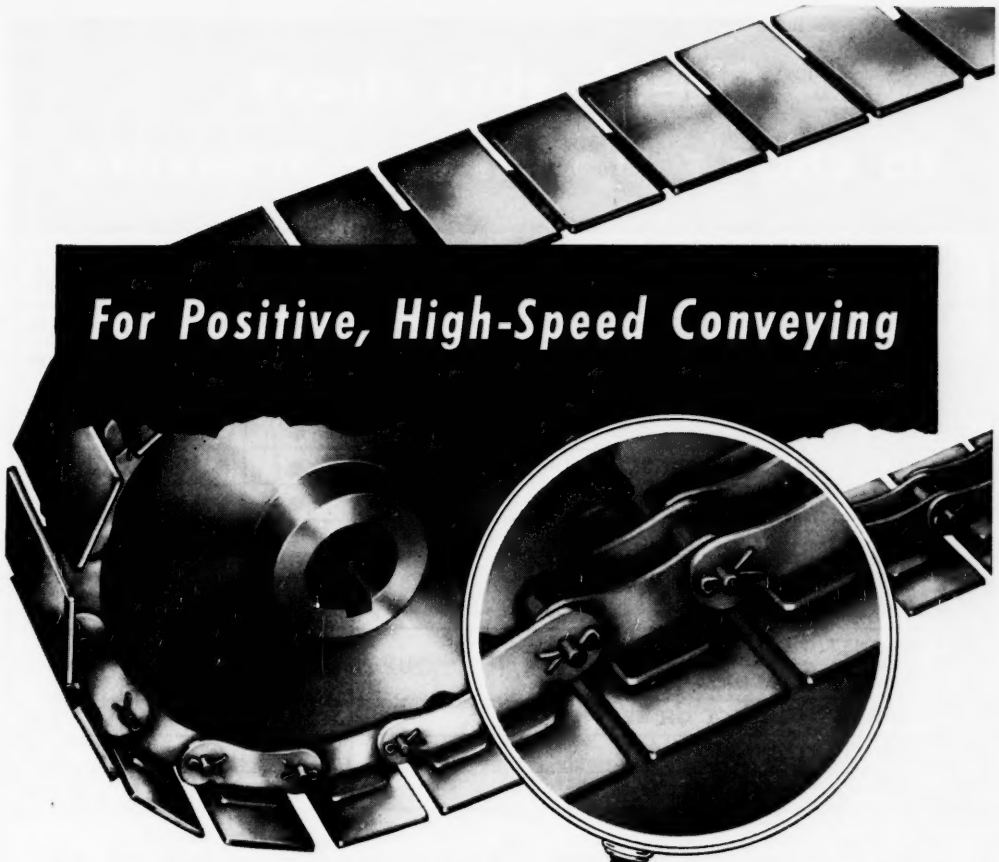
Adopt Panel Layout

Following World War II, the company developed, for the first time in food advertising, the use of the "three panel layout," in which the space is divided into three equal parts. Each of these parts features one of Dole's pineapple products or portrays and describes a new way to combine pineapple with other ingredients or foods. The headlines of these triple-idea ads are placed in the two spaces between the three panels, thus causing the eyes of a reader to sweep across the panels.

Frozen pineapple chunks were successfully placed on the market in 1946. Without any significant amount of advertising space being devoted to this item, its sales volume has been highly satisfactory.

Beginning in the mid-'20's, Dole's advertising-space commitments averaged from $200,000 up to $500,000, or more, annually—especially during the introduction period for pineapple-juice. Outlay also depended upon size of each season's pack. Advertising expenditures topped the $1,000,000 mark in 1938 and later years, and besides magazine space, the program included extensive use of radio.

In 45 years, the industry has increased its production from the original 1,893 cases of sliced pineapple, laboriously prepared and packed by hand to the 1947–48 pack of 11,795,942 cases of pineapple and 9,061,373 cases of pineapple juice—a total of 20,857,315 cases. Dole's share of the most recent pack represented nearly $34,000,000 in net sales income.



Look to the Roller Chain Construction

Whitney LEVEL-LINE Conveyor Chain Drives Assure Smooth Transfer of Materials

Regardless of your equipment — be it washer, filler, labeler, capper, wrapper — Whitney Platform Conveyor Chain assures smooth travel for bottles, cans or cartons.

The all-steel roller chain construction absorbs shock... provides uniform delivery and discharge. Deeply seated in cut tooth drive sprockets, it provides positive high speed conveying over any distance without chattering or jamming. Top plates remain level for sure transfer of goods from one conveyor to another. The smooth surfaces of the plates are easy to clean and keep sanitary. Tapered head pins make chain assembly or disassembly quick and easy. The sturdy construction throughout assures long operating life and minimum maintenance.

Keep your equipment delivering smoothly and steadily—use Whitney Platform Conveyor Chain. Remember, too, Whitney Roller Chain, Silent Chain and Cut Tooth Sprockets will help you keep production going wherever dependable power transmission is required. It pays to Standardize on Whitney. Write for information.

WHITNEY CHAIN & MFG. CO.
Division of Whitney-Hanson Industries, Inc.
226 HAMILTON STREET, HARTFORD 2, CONN.

WHITNEY
LEVEL-LINE
CONVEYOR CHAIN

Check this chart to check up on compressors

	LIST OF FEATURES	Carrier	Makes B	C	D	E	F
1	AUTOMATIC LOAD-FREE STARTING	●	●		●		●
2	BUILT-IN AUTOMATIC CAPACITY CONTROL	●	●				●
3	CAPACITY EXTERNALLY CONTROLLABLE	●					
4	VAPOR-CUSHIONED VALVES	●					
5	INDIVIDUALLY REMOVABLE CYLINDER LINERS	●	●			●	●
6	VAPOR-COOLED CYLINDERS	●	●				●
7	REMOVABLE PRECISION BEARINGS	●	●				
8	OIL-COOLED SEAL	●	●			●	●
9	AUTOMATICALLY REVERSIBLE OIL PUMP	●	●				
10	MAGNETIC OIL-DRAIN PLUGS	●					
11	CUSTOMIZED CONSTRUCTION	●					
12	CHOICE OF DIRECT OR BELT DRIVE	●					●
13	DUAL UNITS	●	●				●
14	APPLICABLE TO "FREON 22"	●		●		●	●

only Carrier Customized Compressors give you all 14

YES, only Carrier Customized Compressors give you *all* these important features—features that add up to longer, more economical service on any refrigeration job.

For instance, automatic load-free starting and built-in capacity control mean low operating cost. Vapor-cushioned valves and magnetic oil-drain plugs assure long life. Precision insert-type bearings and removable cylinder liners provide easy service. With every feature—an advantage!

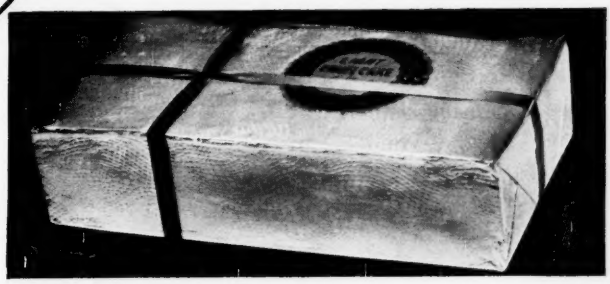
Not only that, Carrier Customized Compressors are designed to team with other Carrier refrigeration components—bases, motors, couplings and condensers, so you get your choice of more than 1000 combinations to fit your specific needs. No matter what the installation, no matter how strict the specification or what type of power is used, there's a Carrier combination that fits it like a glove.

Carrier Customized Units are easy to handle—no special tools required. Perfectly matched and built with all the skill that has made the Carrier name a byword for efficiency and dependability, they're the answer to your toughest refrigeration problem. Write for Catalog 5FH1. Carrier Corporation, Syracuse, N.Y.

Carrier AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

STIMULATE SALES

with 2 brand new ideas



RIEGEL'S FRUIT CAKE WRAP

LAMINATED GLASSINE AND FOIL... PLAIN OR EMBOSSED

Here is a brand-new fruit cake wrap... smart and rich looking... and yet highly protective, practical and economical.

Check its many unique advantages: *Lightproof... Greaseproof... Highly Moisture Proof... Folds Snugly and Quickly Around Cake... Easy for Housewife to Rewrap as Used.*

Sheets or rolls in any sizes... plain or embossed... printed if desired.

INDIVIDUAL PACKETS OF READY-MIXED

CINNAMON AND SUGAR

Here's a new idea that has quickly proven its value through increased bakery sales. Each easy-to-open packet contains ¼ oz. of cane sugar and pure Saigon cinnamon... tightly sealed in a specially made, highly moisture-proof, coated glassine.

IDEAL FOR DOUGHNUTS... eliminates expense of sugaring.

ALSO USED WITH SPECIALTY BREADS... use one to three packets per loaf with recipes for french toast, cinnamon toast and bread puddings. Packets may be printed on both sides to suit your own requirements. Packed in special Riegel Papers by the Cumberland Packing Corp., 2 Cumberland St., B'klyn 1, N. Y.

SEND FOR COMPLETE INFORMATION AND SAMPLES

RIEGEL PAPER CORPORATION • 342 MADISON AVE. • NEW YORK 17, N. Y.

THE MOST IMPORTANT MOTOR

A New Kind of Truck to Reduce the Per Unit Cost of Delivery . . . Increase Payload • Save Time • Add Safety • Lower Maintenance

SAVES RUNNING TIME—Easy to maneuver and park in traffic because of shorter wheelbase, shorter overall length, wider front axle.

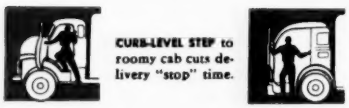
SAVES UNLOADING TIME—Driver gets in and out more quickly—easily—because of curb-level step, wider doors, roomier cab, nothing to climb over.

SAFER IN TRAFFIC—Driver sits in commanding position with wider vision. Sees down to road level only 7 feet ahead; improved up-view for traffic lights.

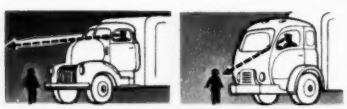
LOWER COST MAINTENANCE—Power-lift Cab saves inspection and servicing time. "Bench-height" front end accessibility improves quality of work done.

LONGER LIFE—Style obsolescence is eliminated by the functional, ultra-modern design. Cab structure is completely bonderized for longer life.

SUPER POWER QUALITY—All the proved dependability of White Super Power Truck units. Engineered for long life . . . low maintenance . . . fuel economy.

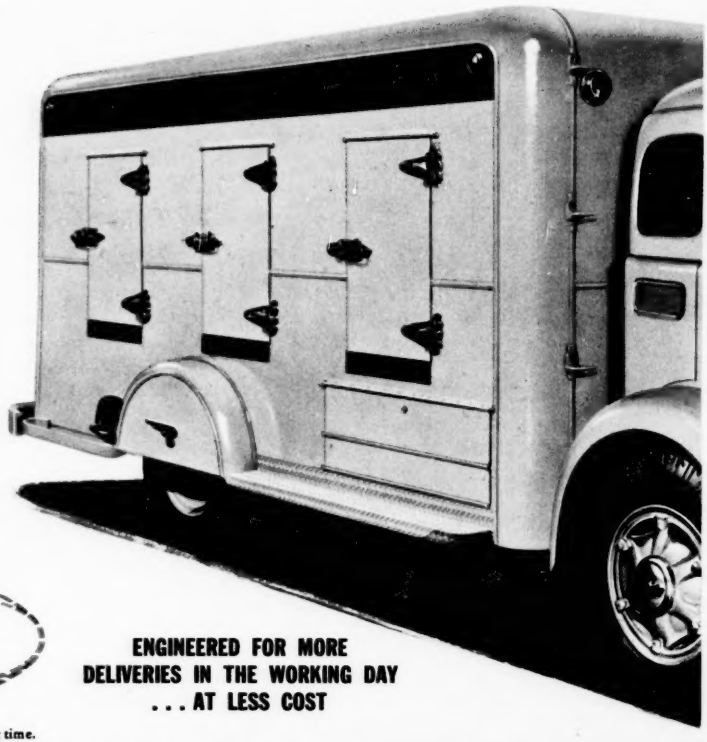


CURB-LEVEL STEP to roomy cab cuts delivery "stop" time.



SUPERIOR VISION in all directions.

SHORTER TURNING RADIUS reduces maneuvering time.

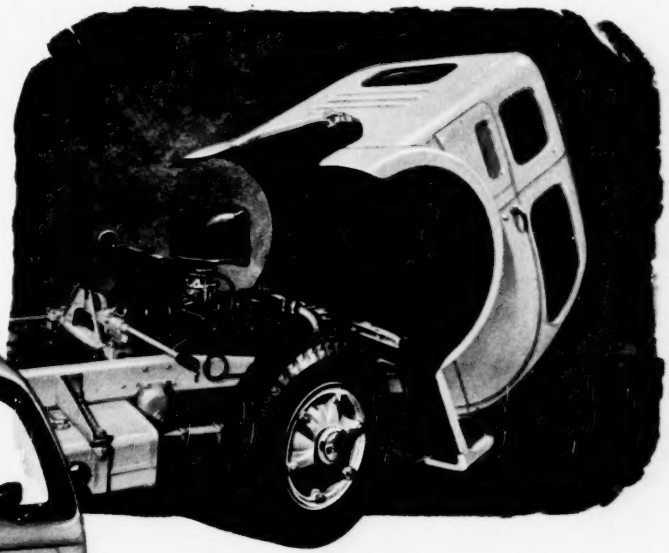


ENGINEERED FOR MORE DELIVERIES IN THE WORKING DAY . . . AT LESS COST

FOR 50 YEARS THE

TRUCK ADVANCE IN YEARS

POWER LIFT CAB provides complete accessibility to mechanical parts in less than 30 seconds at the turn of a key. Actuating mechanism is a rugged version of the dependable device operating landing gear of airliners.



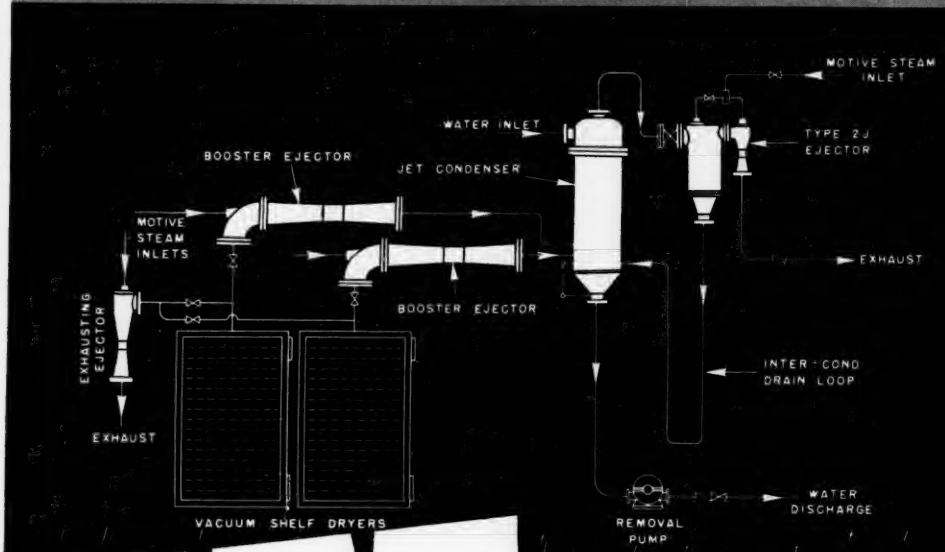
HERE IS THE COMPLETE ANSWER in every engineering detail to the problem of getting more payload delivered per working day, at less cost per unit of delivery. Much safer to operate in modern traffic ... because of the design and construction, and the forward position of the driver, with greatly improved vision in all directions. Maintenance is quick and easy ... and lower in cost ... because of complete accessibility of mechanical parts provided by the unique "turn-of-a-key" power lift cab. All the quality and proved dependability of White Super Power truck units are incorporated in the White 3000. If you operate trucks in your business, it will pay you to get the complete time- and cost-saving story from your local White Representative.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio, U. S. A.
THE WHITE MOTOR COMPANY OF CANADA LIMITED
Factory at Montreal

White
SUPER POWER
3000

GREATEST NAME IN TRUCKS

ONE OF THE DOZEN Flow Sheet Diagrams showing typical applications of C. H. Wheeler Steam Jet Ejectors in Catalog No. 1462. Write for it today.

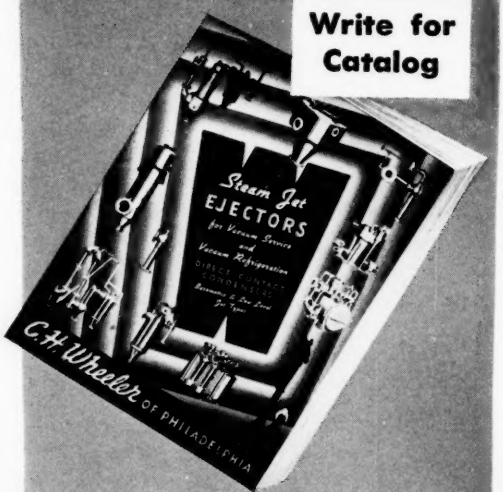


MODERN, SPECIAL HOOK-UPS OF STANDARD PRODUCTS

Diagram shows a Special Three Stage Tubejet Assembly serving two High Vacuum Dryers. Note the two Booster Ejectors in parallel hook-up for each dryer and the Exhausting Ejector for rapid, initial evacuation. Also note the Direct Contact Jet Condenser and the Two Stage Type 2J Ejector with Inter-condenser. . . . Catalog 1462 illustrates and describes our complete range of types from Single Stage Units for maintaining absolute pressures down to 3.5 inch mercury, Two Stage, Three Stage, Four Stage and Five Stage Units for maintaining absolute pressures below 250 microns.

C. H. WHEELER MFG. CO.
1828 Sedgley Ave., Phila. 32, Pa.
REPRESENTATIVES IN MOST PRINCIPAL CITIES

Write for Catalog



C.H. Wheeler

STEAM CONDENSERS • WATER COOLING TOWERS
EJECTORS • STEAM JET VACUUM REFRIGERATION
OF PHILADELPHIA

CIVIC AUDITORIUM
SAN FRANCISCO
JULY 11-14, 1949

Ninth Annual Convention and Exhibition
Institute of Food Technologists

OFFICIAL GUIDE AND DIRECTORY

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. . . IN CONDIMENT SAUCES
"SILENT PARTNERS IN FAMOUS FOODS"
Seasonings by STANGE
. . . IN PICKLED FISH
. . . IN CANNED SOUPS
. . . IN SPICED PICKLES
. . . IN DEHYDRATED SOUPS

Moving swiftly thru the finest stores in America are countless foods *seasoned by Stange.* Fast-selling *cake mix* from a midwestern city . . . *mushroom soup* housewives everywhere know and like, along with *pork and beans* bearing the same label . . . tangy, Jersey-made *catsup* and California *chili sauce* . . . taste-tingling *tomato juice cocktail* from Indiana . . . *pickled fish* packed along the New England coast. All these, and *hundreds more,* owe a share of their success to "Silent Partners in Famous Foods." Let us help give *your* product a Taste Difference . . . to make a big *Sales* Difference. Write today.

Since 1904

WM. J. STANGE CO.

"Rhymes with Tangy"

You are cordially invited to visit Stange's Booth #89 & 90 at the San Francisco Convention of The Institute of Food Technologists. Interesting developments in Stange's C.O.S. Seasonings, Food Colorings and N.D.G.A. Antioxidant will be on display.

CHICAGO 12, ILLINOIS • OAKLAND 6, CALIFORNIA

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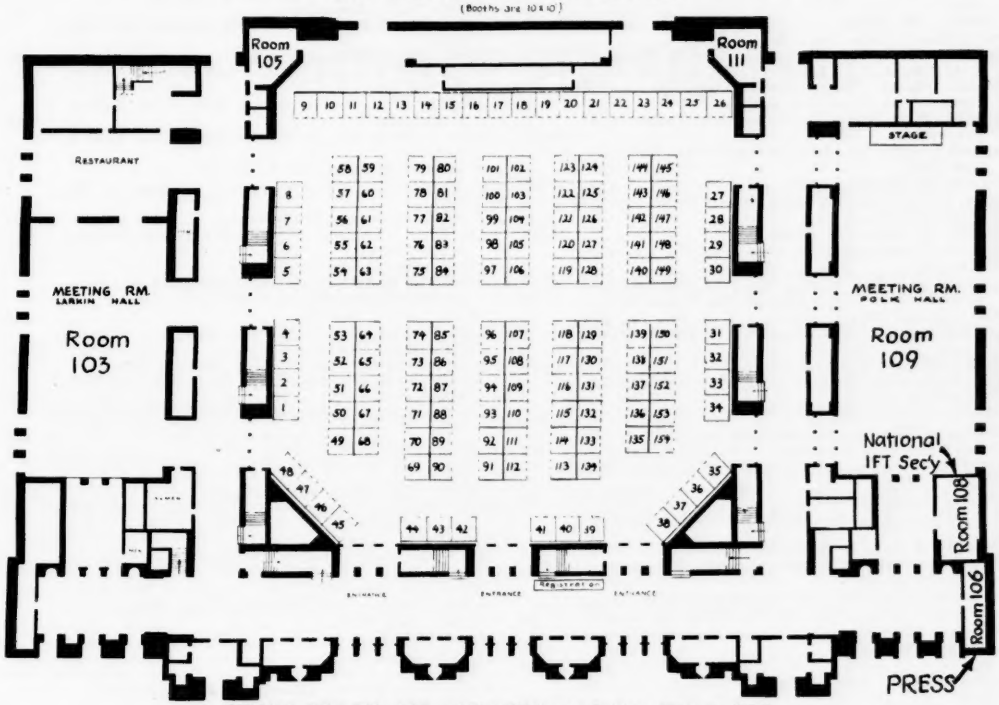
FLOOR PLANS

INSTITUTE OF FOOD TECHNOLOGISTS

JULY 11-14, 1949

CIVIC AUDITORIUM · SAN FRANCISCO

(Booths are 10 x 10)



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HOST: V. R. Jones..... 69

SEE US AT BOOTH 97

1949 Convention—San Francisco

Institute of Food Technologists

SPECIAL MARKETS—INDUSTRIAL DIVISION

WINTHROP-STEARNS INC.

170 VARICK STREET, NEW YORK 13, N. Y.

WINTHROP-STEARNS

QUALITY PRODUCTS FOR THE FOOD INDUSTRY

BAKING INDUSTRY . . . New, improved B-E-T-S ® Bread Enrichment Tablets containing ferrous sulfate—the highly assimilable form of iron—have been accepted by the Baking Industry. Millions of B-E-T-S tablets have been used by small and large bakeries throughout the United States. Fastest disintegrating tablet, assures dependable and uniform enrichment.

FLUID MILK . . . DELTAXIN ® outstanding concentrate—has been declared suitable for the fortification of AMA Council on Foods and Nutrition accepted vitamin D milk. Deltaxin is calciferol, pure crystalline vitamin D_3, dissolved in propylene glycol—mixes readily with milk. The antirachitic factor is distributed uniformly with or without homogenization. Stable, does not become rancid, does not affect color, odor or taste of milk.

EVAPORATED MILK . . . CRYSTALLINE VITAMIN D_2 for fortification of evaporated milk.

FROZEN FOODS . . . ASCORBIC ACID to retard browning, retain flavor of frozen fruits; to help maintain fresh-caught palatability and appearance of frozen fish fillets and steaks.

MILLING INDUSTRY . . . VEXTRAM ® flour enrichment mixture with original starch base carrier . . . free-flowing, uniform feeding and dispersion, minimum increase of ash content. Special formulas for enrichment of corn meal and grits. OXYLITE ® efficient flour bleaching agent—provides optimum color removal economically.

The WINTHROP CHLORINATOR for accurate and economical treatment of hard and soft wheat flours, both bakery and family types.

MACARONI PRODUCTS . . . Special formula VEXTRAM enrichment mixture and B-E-T-S enrichment tablets for enrichment by the continuous and batch methods.

FEED MILLS . . . TRIDEE ® brand of vitamin D_3 derived from **7-dehydrocholesterol** for fortification of poultry feeds. This is the form of vitamin D most effective on all types of poultry. Supplied in granular flour and in oil with emulsifier for spraying. RIBOFLAVIN and water-soluble riboflavin.

PURE CRYSTALLINE VITAMINS AND AMINO ACIDS IN BULK

Roccal ®

Reg. U. S. Pat. Off. and Canada

BRAND

SANITIZING AGENT

GERMICIDE—FUNGICIDE FOR FOOD PLANT SANITATION

ROCCAL is benzalkonium chloride, the original quaternary ammonium germicide, used as a Sanitizing Agent in the food industries. It is based on a radically different principle of bactericidal action. Roccal is accepted by leading public health authorities.

GENERAL DESCRIPTION: Roccal is developed on an entirely new chemical basis. It contains no phenol, iodine, mercury, other heavy metals or hypochlorites and is consequently free from the disadvantages of these types of compounds. Roccal is, however, superior to them in bactericidal power. In proper dilutions, Roccal is non-poisonous, virtually odorless and tasteless, non-irritating to skin, harmless to fabrics and remains stable over long periods of use.

Roccal is freely soluble in water and forms a clear, virtually odorless solution. This aqueous solution is slightly alkaline to litmus.

SOME USES OF ROCCAL

- Sanitizing all equipment used in food processing and quick frozen food plants.
- Sanitizing all pasteurizing equipment and devices used in processing milk, cheese, and other dairy products.
- Sanitizing and inhibiting mold growth in storage and cold storage warehouses.
- Sanitizing equipment and inhibiting mold growth in bakeries and cereal processing plants.
- Sanitizing fillet machines, shrimp deveiners, storage tanks in fish canneries. Also, interior storage areas of fishing vessels.
- Sanitizing Irish suckers, pipe lines, in breaking, freezing, dehydrating eggs.
- Sanitizing poultry packing equipment, food chutes, refrigerators.

SAMPLE AND LITERATURE ON REQUEST

Our Technical Service Department is always ready to provide complete information to assist you in overcoming a bacterial or fungicidal problem in your industry. Write TODAY.

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YOU CAN HAVE A REAL EDGE ON FLAVOR WHEN SALESMEN CUT CANS!

In 100 lb. and 200 lb. drums

Not a flavoring, not a condiment,

Ac'cent will bring out—sustain—*natural* flavors in the foods you pack

A TYPICAL TEST OF Ac'cent®

—IN CANNED ASPARAGUS—

To a filled No. 2 can of asparagus add ¼ to ½ teaspoon of AC'CENT just before sealing. Mark the can so that it can be identified, then process right along with your regular batch. After cooling and aging a few days, cut the AC'CENT sample and a control sample. Notice the outstanding improvement in the AC'CENT sample, the fullness and freshness of flavor.

Probably no food product in this generation has stirred up as much interest and conjecture as Ac'cent. And no wonder. For Ac'cent does two things for foods that nothing before has ever done with such amazing success.

Without adding any flavor, aroma, or color of its own, it (1) *intensifies natural flavor*, and (2) *guards flavor* against the usual loss in processing.

> *Ac'cent is a 99+% pure MSG—mono sodium glutamate, a derivative of vegetable protein. It is the sodium salt of the amino acid, glutamic acid, which occurs naturally in all vegetable and animal protein. In Ac'cent, a pure MSG, you get the full benefit from this vegetable derivative.*

Already there is a large amount of convincing data on the use of Ac'cent in food processing. We invite you to look into the information we have on the use of Ac'cent in your products. Members of our staff of food technologists and chefs are on call to consult with you in your plant and supervise tests.

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International Minerals & Chemical Corporation
General Offices: 20 North Wacker Drive,
Chicago 6, Illinois

Ac'cent makes food flavors sing!

Printed in U.S.A. Trade Mark "Ac'cent" Reg. U.S. Pat. Off

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Program

NINTH ANNUAL CONVENTION

INSTITUTE OF FOOD TECHNOLOGISTS

JULY 9TH TO 14TH, 1949 ★ SAN FRANCISCO, CALIFORNIA

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9–5 Council Meeting	**10–12** Section Officers Breakfast **11–1** Committee on Chemicals in Foods **12:30–3:30** Editorial Committee Luncheon **1:30–3:30** Pectin Standardization Seminar **7:30–9:30** Wine Program **9:30–11:00** Presentation of California Wines	**9–11** General Sessions **11–12** Food Industries Award **12:50** Stephen Babcock Award Luncheon **2–4:30** Concurrent Sessions A. Operation & Production B. Symposium Chem. Treat. Raw Mat. C. Investigations: General D. Investigations: Miscellaneous Products **7:30–10:00** Concurrent Discussion Groups: A. Engineering B. Yeast C. Citrus D. Education E. Fish F. Pickles G. Sanitation H. Gas Preservation I. Potatoes	**9–11:30** Concurrent Sessions: A. Operation & Production B. Investigations: Fruits C. Investigations: Fish, Meat and Poultry Products D. Investigations: Freezing and Processing **12:15** I. F. T. Membership Annual Business Meeting, Luncheon **1:15–3:45** General Session Symposium: Transportation perishable foods **4:00–6:00** Modern Transportation Exhibit **7:30–9:30** Banquet Appert Award	**9–12** Concurrent Sessions A. Operation and Production B. Investigations: Objective and Subjective Evaluat. C. Investigations: Vegetables D. Investigations: General **1:00** Vacation for a Day Buses leave front of Auditorium for: Barbecue Mounted Posse Show Dancing Hiking Sun Bathing Swimming	**9–12** Concurrent Sessions:: A. Operation & Production B. Investigations: Nutrition and Public Health C. Investigations: Fruits D. General **1–6** Short Trips **2:30–5** Frozen Foods Technical Committee	Long trips all day

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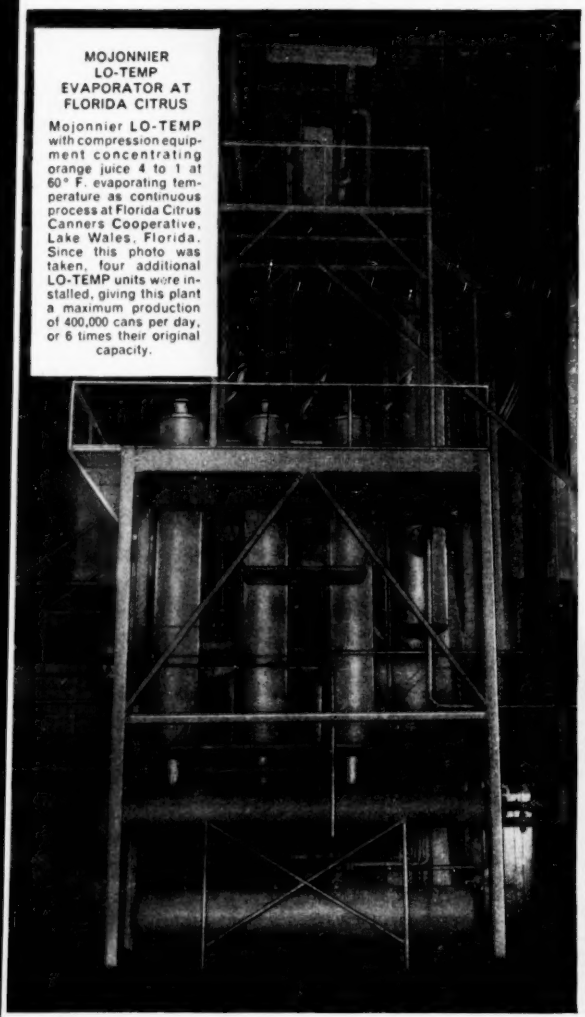
Mojonnier LO-TEMP* EVAPORATOR

...widely acclaimed, totally new approach to the condensing art

Florida Citrus Canners Cooperative, Lake Wales, Florida, have played a major role in the development of quality frozen, concentrated orange juice, using the Mojonnier Lo-Temp Evaporator. Since this pioneering effort, a number of Lo-Temp installations have been made in other major U. S. food plants.



MOJONNIER LO-TEMP EVAPORATOR AT FLORIDA CITRUS

Mojonnier LO-TEMP with compression equipment concentrating orange juice 4 to 1 at 60° F. evaporating temperature as continuous process at Florida Citrus Canners Cooperative, Lake Wales, Florida. Since this photo was taken, four additional LO-TEMP units were installed, giving this plant a maximum production of 400,000 cans per day, or 6 times their original capacity.

HOW IT OPERATES: Instead of employing steam for the source of heat as commonly used at the present time, a new cycle has been created in which secondary compression apparatus *controls* the heat flow. This compressor equipment in the secondary cycle functions as a heat pump to recycle latent heat and obtain the economy of recompression evaporation. The new basic *LO-TEMP approach* results in the following advantages:

1. Any evaporation temperature desired down to 40°F.
2. The economy of multiple effect evaporation at a single temperature.
3. Neither steam nor water used for evaporation (or distillation).
4. When used as still, complete recovery of condensate.

Inquiries are invited covering the application of the LO-TEMP Evaporation System to heat sensitive products such as:

- DAIRY PRODUCTS • CITRUS JUICES • APPLE JUICE
- GRAPE JUICE • PECTIN SOLUTIONS • LIQUID EGG
- PHARMACEUTICALS • CHEMICALS • SUCROSE JUICES

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NINTH ANNUAL CONVENTION—INSTITUTE OF FOOD TECHNOLOGISTS

SATURDAY, JULY 9

9:30–12:00 **Council Meeting** } Palace Hotel
12:15 **Council Luncheon** } *(see hotel bulletin board)*
2:00– 5:00 **Council Meeting** }

President: H. C. Diehl, presiding
Vice-President: B. E. Proctor
Sec'y-Treasurer: C. R. Fellers

Members: Eugene V. Nay, P. K. Bates, E. A. Beavens, L. V. Burton, W. L. Campbell, B. S. Clark, E. D. Clark, W. V. Cruess, M. S. Dunn, K. G. Dykstra, F. W. Fabian, Charles N. Frey, R. D. Gerwe, H. T. Griswold, W. L. Haley, L. R. Hedrick, M. E. Highlands, W. Ray Junk, E. F. Kohman, E. E. Meschter, Emil M. Mrak, John H. Nair, Aksel G. Olsen, S. C. Prescott, A. C. Richardson, C. A. Shilingslaw, C. L. Smith, E. S. Stateler, A. E. Stevenson, M. P. Vucassovich, A. H. Warth, Jasper G. Woodroof.

SUNDAY, JULY 10

10:00–12:00 **Section Officers Breakfast,** Palace Hotel *(see hotel bulletin board)*

Chairman: J. L. Heid,
Florida Citrus Canners Coop., Lake Wales, Florida.

Participants—Chicago: Chairman, E. S. Stateler; Secretary, J. M. Jackson
Florida: Chairman, T. J. Kew; Secretary, George N. Pulley
Great Lakes: Chairman, Ray B. Wakefield; Secretary, James C. Sanford
Iowa: Chairman, Wayne H. Montgomery; Secretary, Robert G. Tischer
Maryland: Chairman, Frank Feild; Secretary, Joseph Winter
Mohawk Valley: Chairman, A. S. Burhans; Secretary, L. L. Bowers
New York: Chairman, R. F. Light; Secretary, Stephen L. Galvin
Northeast: Chairman, Carl R. Fellers; Secretary, J. J. Austin
Northern California: Chairman, W. Ray Junk; Secretary, R. D. McKirahan
Philadelphia: Chairman, G. V. Hallman; Secretary, Miss Katheryn E. Langwill
Puget Sound: Chairman, C. L. Anderson; Secretary, Francis P. Owens
St. Louis: Chairman, A. F. Bucholtz; Secretary, Miss Mary Heckman
Southern California: Chairman, Arthur N. Prater; Secretary, Miss Margaret M. Haws
Western New York: Chairman, John E. Fix; Secretary, William S. Conway, Jr.

11:00–1:00 **Committee on Chemicals in Foods,** Palace Hotel *(see hotel bulletin board)*
Chairman: M. A. Joslyn, University of California
Participants: Fred C. Blank, Floyd DeEds, W. M. Hoskins, Frank Lamb, A. J. Lehman, B. E. Proctor.

12:30–3:30 **Editorial Committee Luncheon,** Palace Hotel *(see hotel bulletin board)*
Chairman: C. Olin Ball, Editor
Associate Editors: W. H. Cathcart, H. C. Diehl, Herman W. Dorn, Charles N. Frey, Warren H. Goss, J. L. Heid, W. Ray Junk, M. L. Laing, L. S. McClung, Emil M. Mrak, Aksel G. Olsen, Bernard L. Oser, Bernard E. Proctor, H. A. Schuette, G. C. Scott, Paul F. Sharp, Hary W. von Loesecke, Paul C. Wilbur.

SUNDAY, JULY 10 (CONTINUED)

1:30–3:30 **Pectin Standardization Seminar,** Palace Hotel *(see hotel bulletin board)*
Presiding: E. E. Meschter, American Preserve Co., Philadelphia, Pa.
Participants: J. J. Williman, Chairman, C. W. Kaufman, Wm. A. Rooker, Paul H. Williams, Jack Nelson, Page K. Boyles, J. J. K. Bristow, Z. I. Kertez, George L. Baker, W. D. Maclay, G. H. Joseph

5:00–10:00 **Registration** at the Whitcomb Hotel, Mezzanine Floor
7:30–9:30 **Reception and Wine Program,** Whitcomb Hotel, Crystal Room
Chairman: Harry Baccigaluppi, President, Wine Institute
7:30 **Introductory Remarks**—Harry Baccigaluppi
7:40 **"Wine Growing in America"**—Movie in Color
7:55 **"Grape Varieties"**—A. J. Winkler, University of California
8:10 **"Wine Types"**—M. A. Amerine, University of California
8:25 **"Flor Sherry"**—W. V. Cruess, University of California
8:40 **"Technological Problems"**—M. A. Joslyn, University of California
8:55 **"Medical Aspects of the Use of Wines"**—Salvatore P. Lucia, M.D., University of California Medical School
9:10 **"Wine Cookery"**—Genevieve Callahan, Food Consultant, San Francisco
9:30–11:00 **"Presentation of California Wines"** (All participating) Whitcomb Hotel, Crystal Room

MONDAY MORNING, JULY 11

8:30–12:00 **Registration,** Civic Auditorium Foyer
9:00–12:00 **Exhibits,** Civic Auditorium Exposition Hall
9:00–11:00 **General Session,** Polk Hall, Civic Auditorium
Chairman: Samuel C. Prescott, Dean Emeritus, M. I. T.
9:00 **Introductory Remarks**—W. R. Junk, Chairman, No. Calif. Sect. & Convention
9:15 **To Be Announced.**
9:45 **"The Food Technologist and the World Food Crisis"**—Dr. Mogens Jul, Chief Technologist, Fisheries Division, Food & Agriculture Organization of the United Nations
10:15 **"Stabilizing Farm Prices"**—Dr. Harry R. Wellman, Director of the Giannini Foundation, University of California, Berkeley
10:45 **"Food Industry Cooperation With the Armed Forces"**—Rohland Isker, Colonel U.S.A. Retired, Secretary, Associates, Food and Container Institute
11:00–12:00 **Food Industries Award,** Polk Hall, Civic Auditorium
11:00 **Introduction**—Frank K. Lawler, *Editor,* Food Industries
11:20 **Presentation**—Dr. W. V. Cruess, University of California
11:45 **Acceptance**—By recipient
12:15 **Stephen M. Babcock Award Luncheon,** Whitcomb Hotel *(see hotel bulletin board)* **Presentation of Award**—*President,* H. C. Diehl; **Acceptance of Award**—By recipient

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NINTH ANNUAL CONVENTION—INSTITUTE OF FOOD TECHNOLOGISTS

MONDAY AFTERNOON, JULY 11

1:00–6:00 Exhibits, Exposition Hall
2:00–5:00 Concurrent Sessions A, B, C and D, Civic Auditorium

Session A, Polk Hall, **Operation and Production,**

Chairman: Dr. Lloyd A. Hall, Griffith Laboratories, Chicago

2:00 "Government Meat Inspection in Canada"—Gordon Rose, Associate Chief Veterinarian, Department of Agriculture, Ottawa, Ontario (1)

2:25 "Use of Pilot Plants in the Food Industry"—Guy Fox, Vice-President, Refinery Division, Armour & Company, Chicago, Illinois (2)

2:50 "Some Advances in the Production of Edible Oils and Fats"—Harold Mitchell, Director of Laboratories, Swift & Company, Chicago, Illinois (3)

3:15 "Technological Advances in Meat Preservation"—F. W. Griffith, Secretary-Treasurer, The Griffith Laboratories, Inc., Newark, New Jersey (4)

3:40 "Solvent Extraction for the Food Industries"—F. Lerman, Kennedy Extraction Division, The Vulcan Copper & Supply Co., Cincinnati, Ohio (5)

4:05 "The Independent Scientific Laboratories Serve the Food Industries"—Roger W. Truesdail, President, Truesdail Laboratories, Los Angeles, California (6)

4:30 "Food Products Liability"—Sidney A. Moss, Attorney, Los Angeles, California (7)

MONDAY AFTERNOON, JULY 11

Session B, Larkin Hall, Civic Auditorium

Symposium: "Chemical Treatment of Raw Materials"

Chairman: Dr. Ray B. Wakefield, Gerbers Products Company, Flint Michigan

2:00 "The Potential Health Hazards Involved With Materials of Unknown or Incompletely Known Toxicity"—Dr. James R. Wilson, Secretary, Council on Foods & Nutrition, American Medical Association, Chicago, Illinois (8)

2:30 "Application of the Federal Food, Drug and Cosmetic Act to Food Raw Materials Bearing Chemical Residues"—Mr. McKay McKinnon, Jr., Chief, San Francisco District, Food & Drug Administration, San Francisco (9)

3:00 "Actual Residues in Foods Resulting from Various Insect Control Programs"—Dr. W. M. Hoskins, Entomology Division, University of California, Berkeley, California (10)

MONDAY AFTERNOON, JULY 11

Session C, Room 401, Civic Auditorum

Investigations—General

Chairman: Dr. William Geddes, University of Minnesota

2:00 "Antioxidants in Hemoglobin Catalyzed Oxidations of Unsaturated Fat"—Irene Chang and Betty M. Watts, Syracuse University (11)

2:25 "A Micro Method of Detecting the Enzymatic Breakdown of Cephalins; Estimation of Free Ethanolamine"—W. Gordon Rose, Western Regional Research Laboratory (12)

2:50 "Experimental Baking in the Wheat Protein Research Program of the Western Regional Research Laboratory"—Angeline H. Elder, J. W. Pence and D. K. Mecham, Western Regional Research Laboratory (13)

3:15 "Storage Studies on Active Dried Bakers' Yeast"—Roy E. Morse, University of Georgia, and C. R. Fellers, University of Massachusetts (14)

3:40 "The Sizing of Don Exchange Equipment for Food Industries"—N. K. Heister, Stanford Research Institute, Palo City, Calif. (15)

4:05 "Packaging Whipped Cream in Pressurized Containers"—W. Earl Graham, Crown Can Company, Philadelphia (16)

4:30 "Browning and the Fluorescence of Evaporated Milk"—N. P. Tarassuk and H. D. Simonson, University of California, Davis (17)

MONDAY AFTERNOON, JULY 11

Session D, Room 402 Civic Auditorium

Investigations—Miscellaneous Products

Chairman: Dr. Agnes Fay Morgan, University of California

2:00 "The Jelly Grading of Pectin"—Mamie Olliver, Chivers & Sons, Ltd., Cambridge, England (18)

2:25 "Pectinate Coating"—H. S. Owens, H. A. Swenson, J. C. Miers, and E. Lowe, Western Regional Research Laboratory (19)

2:50 "The Lactic Acid Content of California Wines"—Maynard Amerine, University of California, Davis (20)

3:15 "The Bulk Fermentation of Spanish-Type Green Olives"—R. N. Ball, Ed Van Dellen and J. B. Jaquith, Pacific Olive Co., Visalia, Calif., and Reese Vaughn, Joseph Tabachnick and G. T. Wedding, University of California, Berkeley (21)

3:40 "Irish Moss Extractives"—Leonard S. Stoloff, Krim-Ko Corporation, New Bedford, Massachusetts (22)

4:05 "Hygroscopicity of Sugar and Other Factors Affecting Retention of Quality"—Theodore J. Nelson, California and Hawaiian Sugar Refining Corporation, Ltd., Crockett, California (23)

MONDAY EVENING, JULY 11, 1949

6:00–11:00 Exhibits, Exposition Hall
7:30–10:30 Concurrent Discussion Groups, Polk Hall, Civic Audiorium

A. Advanced Food Plant Engineering," Polk Hall—*Chairman:* Frank K. Lawler, Editor, Food Industries

B. "Brewers Yeast," Room 403, Civic Auditorium —*Chairman:* Elsie Singruen, Secretary, Brewers Yeast Council, Chicago

C. "Citrus Products," Room 401, Civic Auditorium —*Chairman:* J. L. Heid, Florida Citrus Canners Cooperative, Lake Wales, Florida

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D. "Education," Room 111, Civic Auditorium—*Chairman:* Dr. E. M. Litwiller, Oregon State College, Corvallis, Oregon

E. "Fish and Fish Products," Room 108, Civic Auditorium—*Chairman:* Dr. H. L. A. Tarr, Pacific Fisheries Experimental Station, Vancouver, B. C.

F. "Pickles and Pickled Products," Room 404, Civic Auditorium—*Chairman:* Dr. J. L. Etchells, U.S.D.A., Raleigh, North Carolina

G. "Plant Sanitation," Larkin Hall—*Chairman:* Dr. M. E. Parker, Illinois Institute of Technology, Chicago

H. "Preservation with Gases," Room 402, Civic Auditorium—*Chairman:* H. J. Phaff, University of California, Berkeley

I. "Processing Potatoes," Room 105, Civic Auditorium—*Chairman:* O. P. Pierson, Caribou, Maine

TUESDAY, JULY 12

8:30–12 Registration, Civic Auditorium Foyer

9:00–12 Exhibits, Exposition Hall

9:00–11:30 Concurrent Sessions: A, B, C, and D, Civic Auditorium

Session A, Polk Hall—**Operation and Production**

Chairman: Roger Truesdail, Truesdail Laboratories, Los Angeles

9:00 "Chlorination Applied to the Food Industry"—Wm. J. Scarlett, Wallace & Tiernan Co., Inc., Newark, New Jersey (25)

9:25 "Your Salt by Modern Manufacturing Methods"—Paul Imes, Chief Chemist, Carey Salt Co., Hutchinson, Kansas (26)

9:50 "Industrial and Production Trends in the Baking Industry"—Wm. H. Cathcart, Director of Laboratories, The Great Atlantic and Pacific Tea Co., National Bakery Division, New York, New York (27)

10:20 "Electro-Sensing . . . an Advanced Measuring Tool for Food Process Control"—Lloyd E. Slater, Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia, Penn. (28)

10:45 "Research Problems in the Field of Dairy Industry"—Paul F. Sharp, Director, University of California Agricultural Experiment Station, University of California, Berkeley, California (29)

11:10 "Fishery By-Products in Washington and Oregon"—F. Bruce Sanford, Chemist, Fishery Technological Laboratory, U. S. Department of the Interior Fish and Wildlife Service (30)

TUESDAY MORNING

Session B, Room 401, Civic Auditorium

Investigations, Fruits

Chairman: Dr. M. A. Joslyn, University of California

9:00 "Problems Underlying the Behavior of Citrus and Avocado Fruits in Storage"—J. B. Biale, University of California, Los Angeles (31)

9:25 "Ascorbic, Citric and Dihydroxymaleic Acids as Antioxidants in Frozen Pack Fruits"—C. C. Strachan and A. W. Moyls, Dept. of Agriculture, Summerland, B. C. (32)

9:50 "Sugars of Citrus Juices"—R. M. McCready, E. D. Walter and W. D. Maclay, Western Regional Research Laboratory (33)

10:15 "Certain Inaccuracies in the Determination of Coliforms in Frozen Orange Juice"—J. Martinez and M. D. Appleman, University of Southern California (34)

10:40 "Bacteriological Studies on Commercially Prepared Orange Juice Stored at —10° F"—E. R. Wolfrod, Western Regional Research Laboratory (35)

11:05 "Laboratory Studies on Factors Affecting Leaching Losses During Processing of Apples"—Ann M. Mylne and C. G. Seegmiller, Western Regional Research Laboratory (36)

11:30 "Syrup Treatment of Apple Slices for Freezing Preservation"—D. G. Guadagni, Western Regional Research Laboratory (37)

TUESDAY MORNING

Session C, Room 402, Civic Auditorium

Investigations, Fish, Meat and Poultry Products

Chairman: Dr. George F. Stewart, Iowa State College

9:00 "Further Studies on the Process of Freezing Eggs in the Shells"—Socrates A. Kaloyereas, Louisiana State University (38)

9:25 "Some Effects of the Shell Treatment of Eggs With Oil"—J. R. Vickery, Division of Food Preservation, Homebush, N.S.W., Australia (39)

9:50 "Post-Mortem Changes in Stored Meat. I. Microorganisms Associated with Development of Slime on Eviscerated, Cut-Up Poultry"—John C. Ayres, Winston Ogilvy and George F. Stewart, Iowa State College (40)

10:15 "The Freezing Preservation of Turkey Meat Steaks"—A. A. Klose and H. L. Hanson, Western Regional Research Laboratory (41)

10:40 "Palatability of Beef Stored at 0° F as Affected by Moisture Loss and Oxygen Availability"—M. P. Steinberg, J. D. Winter and Andrew Hustrulid, University of Minnesota (42)

11:05 "Methods for Determining the Incidence of Putrefactive Anaerobic Spores in Meat Products"—Martin V. Burke, K. H. Steinkraus and John C. Ayres, Iowa State College (43)

11:30 "A Comparison of Chemical Changes in Mackerel Tissues Treated by Ionizing Radiation"—John T. R. Nickerson, Samuel A. Goldblith and Bernard E. Proctor, Massachusetts Institute of Technology (44)

TUESDAY MORNING

Session D, Room 403, Civic Auditorium

Investigations, Freezing and Processing

Chairman: Dr. R. Legault, Western Regional Research Laboratory, Albany, Calif.

9:00 "Activity of Wetting Agents—Temperature Effects"—F. H. Lucas and A. H. Brown, Western Regional Research Laboratory (45)

9:25 "Newer Blanching Principles"—Margaret Ives, American Can Company, Maywood, Illinois (46)

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9:50 "Observation of Color Changes in Some Processed and Stored Foods"—E. J. Eastmond, Western Regional Research Laboratory (47)

10:15 "Techniques and Procedures for Testing Commercial Air-Blast Freezers"—O. H. Spaugh, G. S. Smith and E. Lowe, Western Regional Research Laboratory (48)

10:40 "Fundamentals of Concentrating Liquids by Freezing"—Rudolf Heiss, Institut für Lebensmitteltechnologie, Munich, Germany (49)

11:05 "A Defrosting Indicator for Frozen Foods"—A. A. Anderson, Western Regional Research Laboratory (50)

11:30 "Recent Developments in Food Freezing"—R. W. Kilburn, Food Machinery & Chemical Corp., San Jose, Calif. (51)

TUESDAY AFTERNOON

12:00 noon Annual I. F. T. Business meeting, Luncheon, Hotel Whitcomb *(see bulletin board)*
President, H. C. Diehl—presiding.

TUESDAY AFTERNOON, JULY 12

1:15–3:45 GENERAL SESSION, Polk Hall, Civic Auditorium

Symposium: **Long Distance Transportation of Perishable Foods**

Chairman: B. E. Proctor, Massachusetts Institute of Technology, Cambridge, Mass.

1:15 "Transportation of Fresh Fruits and Vegetables in Refrigerated Freight Cars"—Mr. John N. Kelley, Manager, Fruit Transportation, Fruit Dispatch Company, New York, N. Y. (52)

1:45 "Performance Tests in Refrigerator Cars"—Mr. W. T. Pentzer, Senior Physiologist, U. S. D. A. Horticultural Field Station, Fresno, Calif. (53)

2:15 "Marine Transportation of Perishables"—Mr. William Keller, United Fruit Co., New York, N. Y. (54)

2:45 "Recent Advances in the Air Transportation of Perishable Foods"—Mr. J. Prescott Blount, California Aeronautical Commission, Sacramento, Calif. (55)

3:15 "Reduction of Post Harvest Spoilage in Fresh Fruits and Vegetables Destined for Long Distance Shipment"—Dr. Dean E. Pryor, Phytopathological Research, Wallace & Tiernan Sales Corp., Monrovia, Calif. (56)

4:15–6:00 "Inspection of Modern Transportation Facilities for Perishable Foods"—(Details to be announced at symposium)

7:30–9:30 Banquet, Fairmount Hotel
President, H. C. Diehl—presiding.
Nicholas Appert Award
Presentation—Mr. Charles Smith, Chairman, Chicago Section of I. F. T.
Acceptance and address by Nicholas Appert Medalist, Dr. Roy C. Newton, Vice President, Swift and Co., Chicago, Ill.

WEDNESDAY MORNING, JULY 13

8:30–12:00 Registration in Auditorium
9:00–12:00 Exhibits, Exposition Hall
9:00–12:00 CONCURRENT SESSIONS A, B, C and D, Civic Auditorium

SESSION A, Polk Hall

Operation and Production
Chairman: John M. Jackson, Research Division, American Can Co., Maywood, Illinois

9:00 "Controlling Seasonal Pack Costs"—Douglas Watson, Management Consultant, McKinsey & Company, San Francisco, California (57)

9:25 "Some Reciprocal Actions Affecting Foods and Containers Due to Freezing"—W. J. Finnegan, Consulting Engineer, W. J. Finnegan Company, Los Angeles, California (58)

9:50 "Some Fundamental Considerations in the Processing of Frozen Orange Juice Concentrate"—C. W. Kaufman and H. A. Campbell, Research & Development Department, General Foods Corporation, New York (59)

10:15 "Quality and Nutritive Value of Peas as Affected by Blanching"—D. G. Heberlein, Louis Ptak, Sidney Medoff and L. E. Clifcorn, Research Department, Continental Can Co., Chicago, Illinois (60)

10:40 "Pineapple Fruit Quality Control"—F. P. Mehrlich, Ass't. Vice-President, Director of Research, and Richard B. Morse, Hawaiian Pineapple Co., Honolulu 1, T. H. (61)

11:05 "Influence of Packing Conditions on the Process Requirements of Vacuum Packed Whole Kernel Corn"—W. H. Wade, D. V. Alstrand, H. A. Benjamin and J. M. Jackson, General Research Laboratory, American Can Co., Maywood, Illinois (62)

11:30 "Influence of Storage Conditions on Ascorbic Acid Content and Quality of Canned Orange Juice"—J. F. Feaster, O. G. Braun, D. W. Riester, and P. E. Alexander, American Can Company, Maywood, Illinois (63)

WEDNESDAY MORNING, JULY 13

SESSION B, Larkin Hall Civic Auditorium

Investigations, Objective and Subjective Evaluations
Chairman: Dr. Helen L. Hanson, Western Regional Research Laboratory, Albany, California

9:00 "Flavor Profiles—a New Approach to Flavor Problems"—S. E. Cairncross and L. B. Sjöström, Arthur D. Little, Inc., Cambridge, Mass. (64)

9:25 "Improving the Reliability of Analytical Organoleptic Tests"—Frances Carlin, Iowa State College (65)

9:50 "Studies on Human Appetite"—Franz R. Goetzl, The Permanente Foundation, Oakland, California (66)

10:15 "Quantitative Determination of Flavor and Odor of Frozen Fruits and Vegetables"—John B. Wegener, Carl M. Hill, Ruby M. Prigmore, Mary E. Hill, Tennessee Valley Authority and Tennessee Agricultural and Industrial State College, Knoxville (67)

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10:40 "New Synthetics for Flavors"—Abraham Seldner, F. Ritter & Company, Los Angeles, California (68)

11:05 "Objective Evaluation of Odor Deterioration in Orange Oil"—B. E. Proctor and E. M. Kenyon, Massachusetts Institute of Technology (69)

11:30 "Development of Objective Methods for Determining Quality Factors, with Special Reference to Raw and Canned Corn"—Amihud Kramer, University of Maryland (70)

WEDNESDAY MORNING, JULY 13

SESSION C, Room 401 Civic Auditorium

Investigations, **Vegetables**

Chairman: Dr. Arthur N. Prater, Gentry, Inc., Los Angeles

9:00 "Vitamin Retention in Raw, Cooked, Dehydrated and Canned Dry Beans"—Lowell E. Kidder, Marian Hunner, Betty C. Carl, and Agnes Fay Morgan, University of California, Berkeley (71)

9:25 "Observations on the Oxidase of Asparagus"—W. V. Cruess and James Sugihara, University of California, Berkeley (72)

9:50 "Acetaldehyde and Related Carbonyl Compounds in Frozen Peas"—Jean David, Department of Agriculture, Montreal, Quebec, Canada (73)

10:15 "Effect of Storage Temperature on Quality of Frozen Peas"—F. E. Lindquist, W. C. Dietrich and Mildred M. Boggs, Western Regional Research Laboratory (74)

10:40 "The Role of Bruising in the Development of 'Delay' Off-Flavor in Peas"—Rachel Uhvits and Alice Collings, Western Regional Research Laboratory (75)

11:05 "Value of Starch Coating in the Preserva- of Quality of Dehydrated Carrots"—M. P. Masure, G. S. Bohart, E. J. Eastmond and Mildred M. Boggs, Western Regional Research Laboratory (76)

11:30 "Effect of Irrigation on the Yield and Quality of Vegetable Crops"—John B. MacGillivray, University of California, Davis. (77)

WEDNESDAY MORNING, JULY 13

SESSION D, Room 402 Civic Auditorium

Investigations, **General**

Chairman: Mr. Walter Richert, Wines and Vines Magazine, San Francisco

9:00 "Canning and Pasteurization of California Dates"—B. W. Nielsen, R. J. McColloch and E. A. Beavens, Bureau of Agricultural and Industrial Chemistry, U. S. D. A., Los Angeles (78)

9:25 "Use of Epoxides in the Preservation of Foods"—H. J. Phaff, E. M. Mrak, University of California, Berkeley, and C. D. Fisher, Coast Laboratories, Fresno (79)

9:50 "Effects of Gases on Shelf Life of Food Products"—A. L. Bayes, The Linde Air Products Company, Tonawanda, New York (80)

10:15 "Mushroom Mycelium Production by Submerged Fermentation"—Harry Humfeld, Western Regional Research Laboratory (81)

10:15 "Packaging Sugar in Paper Bags"—W. W. McGimpsey, California and Hawaiian Sugar Refining Corporation, Ltd., Crockett, California (107)

11:05 "Peroxidase Activity of Apple Tissue"—R. R. Reddi, W. B. Esselen Jr., and C. R. Fellers, University of Massachusetts, Amherst, Mass. (83)

11:30 "Film Yeast on Cucumber Brines"—John L. Etchells & Thomas A. Bell Bureau of Agricultural Chemistry, USDA, Raleigh N. C. (83A)

WEDNESDAY AFTERNOON, AND EVENING JULY 13

1:00–11:00 Vacation for a Day

1:00 Buses leave Auditorium for Adobe Creek Inn, Los Altos, California

2:30 Outing at the Adobe Creek Inn

Sheriff's Mounted Posse Show (Santa Clara County, California)

Outdoor Barbecue—Hosts—International Minerals and Chemicals Corp.

Dancing

Swimming

Sun Bathing

Hiking

10:00 Buses leave for San Francisco

THURSDAY MORNING, JULY 14

9:00–12:00 Exhibits, Exposition Hall

9:00–12:00 Concurrent Sessions, A, B, C, and D, Civic Auditorium

SESSION A, POLK HALL

Operation and Production

Chairman: Ben F. Buchanan, Director Technical Service, Amino Products Division, International Minerals and Chemicals Corporation

9:00 "Aspects of Modern Onion and Garlic Dehydration"—Robert M. Stephenson, Chief Chemist, Basic Vegetable Products, Inc., Vacaville, California (84)

9:25 "Properties and Usefulness of Hydrolyzed Vegetable Proteins"—Lewis J. Minor, Stephen L. Galvin and Andrew J. Patton, Huron Milling Co., Harbor Beach, Michigan (85)

9:50 "The Occurrence of Free Glutamic Acid in Various Foods"—Lucile R. Hac, M. Louisa Long and M. J. Blish, International Minerals and Chemical Corp., Amino Acid Division, Rossford, Ohio (86)

10:15 "Essential Oils, Source, Production and Increasing Importance in Food Industries"—Arthur Downey, Asst. Vice-President, Director of Reasearch and Techhnology, Magnus, Mabee & Reynard, Inc., New York (87)

10:40 "From Wild Orchid to the Finest Vanilla Extract"—Alexander Katz, F. Ritter & Co., Los Angeles, California (88)

11:05 "Citrus Oils and their Methods of Extractions"—Ernest Guenther, Vice President and Chief Chemist, Fritzsche Brothers, Inc., New York (89)

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THURSDAY MORNING, JULY 14

SESSION B, Larkin Hall, Civic Auditorium

Investigations, **Nutrition and Public Health**

Chairman: Franz Goetzl, Ph.D., M.D., Permanente Foundation, Oakland

9:00 "Importance of Diet in Chronic Toxicity Studies"—Robert H. Wilson and Floyd DeEds, Western Regional Research Laboratory (90)

9:25 "Significance of Chronic Toxicity Studies"—Floyd DeEds, Western Regional Research Laboratory (91)

9:50 "Toxicity of Thioacetamide in Rats"—Anthony M. Ambrose and Floyd DeEds, Western Regional Research Laboratory, and Leland J. Rather, Stanford University School of Medicine (92)

10:15 "Experiments with Delayed Supplementation of Vitamins"—Ernest Geiger, J. Chersky, and E. B. Hagerty, University of Southern California (93)

10:40 "Studies on Optimum Fat Requirements"—H. J. Deuel, S. M. Greenberg, C. E. Calbert, E. Savage and T. Fukui, University of Southern California (94)

11:05 "The Retention of Vitamins in Sulfited Dehydrated Vegetables"—Agnes Fay Morgan, Betty C. Carl, L. E. Kidder, Lois E. Witham and Marian Hunner, University of California, Berkeley (95)

11:30 "Nutritional Value of Fish Proteins and Amino Acids"—M. S. Dunn, University of California at Los Angeles (96)

THURSDAY MORNING, JULY 14

SESSION C, Room 401, Civic Auditorium

Investigations, **Fruits**

Chairman: Dr. Ferd. Mehrlich, Hawaiian Pineapple Co., Ltd., Honolulu, T. H.

9:00 "The Enzymatic Oxidation of Phenolic Compounds in Frozen Peaches"—D. G. Guadagni, D. G. Sorber and Jean S. Wilbur, Western Regional Research Laboratory (97)

9:25 "Effect of Temperature and Exposure on the Peeling of Fruits and Vegetables"—John L. Boyen, Atlas-Pacific Engineering Co., Inc., Emeryville, California (98)

9:50 "Comparative Value of Certain Carbonyl Enediols in Retarding Enzymic Browning of Fruits"—H. L. A. Tarr and N. E. Cooke, Fisheries Research Board, Vancouver, B. C. (99)

10:15 "Studies on the Texture of Frozen Apricot Skins"—Leonora Hohl Strohmaier, University of California, Berkeley (100)

10:40 "Effect of Storage Temperature on Brined Cherries"—Edward Ross State College of Washington (101)

11:05 "High- and Low-Pressure Bulk Storage of Apple Juice"—Hans M. Freund, Frenot, Ltd., London, England (102)

11:30 "Prevention of Discoloration in the Milling of Apples for Natural Apple Juice"—F. E. Atkinson and C. C. Strachan, Dept. of Agriculture, Summerland, B. C. (103)

THURSDAY MORNING, JULY 14

SESSION D, Room 402, Civic Auditorium

General Chairman: Edwin L. Mitchell, Richmond-Chase Company, San Jose, California

9:00 "Some Phases of the Application of Food Technology to Standardized Labelling of Canned Fruits and Vegetables"—J. R. Esty, National Canners Association, San Francisco, California (104)

9:25 "Factors Influencing Pressure Variations Within Hermetically Sealed Glass Containers"—John M. Sharf, Armstrong Cork Company, Lancaster, Pa. (105)

9:50 "Sequestrene—a New Agent for Clarifying Wine"—Jack K. Krum, University of Massachusetts, Amherst, Mass. (106)

10:40 "A Continuous System of Yeast Production"—W. O. Gordon, H. J. Janssen, Southern Regional Research Laboratory (82)

10:40 "Introduce your Engineer to a Food Technologist"—Edward A. Smith, Associated Date Growers and Packers, Indio, California (108)

11:05 "Planning to Meet Requirements of Food Processors for Waste Disposal"—W. J. O'Connell and Keith A. Fitch, W. J. O'Connell and Associates, San Francisco, California (109)

11:30 "Why Food Industry Sanitarians Must Perforce Train Pest Control Operators"—Donald H. Little, Dried Fruit Association of California, San Francisco, California (110)

THURSDAY AFTERNOON, JULY 14

1:00—6:00 Local Trips

Point of departure, Civic Auditorium.

A poll of those planning to go on various trips will be taken at the time of registration. Tickets will be available for distribution at time of registration. To be set at least 3 days in advance. Leave 1:30 p.m. and return about 5:00 p.m. Approximate Transportation cost $1.25, for trips A, B and C.

Trip A. Western Regional Research Laboratory and The University of California Campus, Including the Cyclotron.

Trip B. Gerber Products Company, Oakland, Cal. Stokely Foods Inc., Oakland, Cal.

Trip C. San Francisco Navy Shipyards. (Inspect battleship Iowa, Cruisers Shangrila and Hornet, other cruisers, destroyers and submarine Dentuda; Bikini target vessel Independence. Description of Bikini A-bomb test.)

Trip D. C and H Sugar Refinery, Crokett, Calif. (Transportation furnished.)

2:30—5:00 Frozen Foods Technical Committee Meeting. At the Western Regional Research Laboratory, U. S. D. A., Albany, Calif. E. H. Wiegand, *Chairman.*

6:00—9:30 Trip. Rainer Brewing Company, San Francisco. Beer and Food. Limited to 60 persons. Taxi fare about 50¢ each way.

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NINTH ANNUAL CONVENTION—INSTITUTE OF FOOD TECHNOLOGISTS

FRIDAY, JULY 15

Point of departure, Civic Auditorium.

A poll of those planning to go on various trips will be taken at the time of registration. Tickets will be available for distribution at time of registration. To be set at least 3 days in advance.

All-day trips. Leave 8:30 a.m. and return about 5 p.m. Approximate transportation cost $2.50 each. (Except Trip C.)

Trip A. Napa Valley Wineries.
Inglenook Winery — Beauleau Vineyards
Napa Valley Cooperative *or* Beringer Bros.
Beringer Bros. — L. M. Martini.

Trip B. Santa Clara Valley. Inspection of International Mineral and Chemical Co. plant at San Jose, Calif. A Large Fruit Cannery. Stop at Stanford University Campus on return trip.

Trip C. Basic Vegetable Products Co., Vacaville, Calif. *(No expense, the company will provide transportation.)*

WOMEN'S ENTERTAINMENT COMMITTEE

Irene C. McCarthy—Chairman
Dr. Helen Hanson—Co-Chairman
Ilma Lucas
Dr. Vera Mrak
Mrs. George Marsh

WOMEN'S PROGRAM

The women's program has been arranged for the fullest enjoyment of your hours in San Francisco. In order for you to participate, please register at Whitcomb Hotel, 1231 Market Street (between 8th and 9th Streets), Sunday, July 10, 4:00 p.m. to 10:00 p.m. Late registrations will be handled Monday, July 11, at Civic Auditorium—Main Lobby, between the hours of 9:00 and 5:00. Registration fee is $2.00. Tickets for all events will be available at time of registration.

TICKETS REQUIRED FOR ALL FUNCTIONS

SUNDAY, JULY 10

7:30 p.m. to 11:00 p.m.—Reception and Wine Meeting, Whitcomb Hotel. Presentation of California Wines. (Convention Function)

MONDAY, JULY 11

10:30 '49er Brunch, Fairmont Hotel—Red Room—followed by an extensive tour of San Francisco.

The Fairmont is atop Nob Hill, corner of Mason and California, directly across the street from the Mark Hopkins. These hotels may be reached by California or Stockton Street cable cars.

The brunch will be a "get acquainted" opportunity carried out in the best '49er tradition. Immediately following brunch, busses will be boarded at the main, Mason Street, entrance of the Fairmont.

The tour of San Francisco is so planned that you may get an early introduction to the City, discover its charm, and learn its many points of interest. You will see Chinatown, Fishermen's Wharf, Civic Center, Mission Dolores, St. Francis Wood and Sea Cliff, the Pacific Ocean, Golden Gate and its bridge, Golden Gate Park, Twin Peaks and many more spots of interest. The tour requires three hours.

Brunch—$1.50. The tour—$2.59

TUESDAY, JULY 12

12:30 Luncheon in an Oriental motif, Mark Hopkins Hotel—Room of the Dons.

A floral demonstration featuring California flowers and arrangements. Presentation will be by Podesta and Baldocchi, America's most famous florists, known the world over for their beautiful window displays.

Luncheon and flower show—No charge

7:30 p.m. Hawaiian Banquet. Palace Hotel (Convention Function).

Dress to please your own taste. Afternoon dresses or dinner dresses are in order.

WEDNESDAY, JULY 13

9:45 a.m. Informal trips to some of San Francisco's leading shops:

Gump's—250 Post Street, between Grant and Stockton Streets.
World noted art goods including the renowned jade collection.

I. Magnin's—Stockton Street at Geary Street.
One of the country's finest women's specialty shops, housed in an elaborate setting.

V. C. Morris—140 Maiden Lane, between Grant and Stockton Streets.
Modernistic newly designed shop. The only one in San Francisco designed by Frank Lloyd Wright. Table accessories, silver, crystal, china and linen, their specialties.

Ransohoff's—259 Post Street, between Grant and Stockton Streets.
An outstanding women's apparel shop for the discriminating woman.

Groups are limited to forty so first registered will be first served. Time will only allow each of you to see one shop—the choice is yours. Approximately one hour per trip will be required. There will be hostesses to greet you at each of these shops. Please be prompt!

1:00 p.m. (Convention Function)—A day in the country at Adobe Creek Lodge near Los Altos—Barbeque, swimming, dancing, games, hiking, and entertainment by the Santa Clara County Mounted Sheriff's Posse.

Informal cottons, slacks or any type of play clothes will be in order. Bring your swim suit and colored glasses.

Buses leave Civic Auditorium 1:00 p.m. Arrive Adobe Creek Lodge at 2:30 p.m. Buses return to San Francisco at 10:00 p.m.

Bus Trip—$1.50. Barbeque—No charge

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NINTH ANNUAL CONVENTION—INSTITUTE OF FOOD TECHNOLOGISTS
PRODUCT CLASSIFICATION OF EXHIBITORS
WITH BOOTH NUMBERS

ACETATE OF SODA
Merck & Co. (134)

ACIDS—Edible
Merck & Co. (134)
Chas. Pfizer Co., Inc. (135)

ACIDS—Amino
A. E. Staley Mfg. Co. (128)
Winthrop-Stearns, Inc. (97)

ACIDS—Phosphoric
Merck & Co. (134)

ACCUMULATOR—Packed Box
Food Machinery Corp. (113-114-115)

ADHESIVES
National Starch Products Inc. (45)

AIDS—Clarifying & Purifying
Braun-Knecht-Heimann Co. (95)

ALIGNER, UNSCRAMBLER
Food Machinery & Chem. Corp (113-114-115)

ALTIMETERS
Wallace & Tiernan Co., Inc. (3-4)

ALUM
Merck & Co. (134)

ANTIOXIDANTS
Griffith Labs Inc. (46)
Wm. J. Stange Co. (89-90)

APPLICATOR—Wax
Food Machinery Corp. (113-114-115)

APPARATUS AND SUPPLIES, LABORATORY
Braun-Knecht-Heinmann Co. (95)

APPARATUS, WASHING
Laboratory Equipment Co. (29)

AROMATICS
Fritzsche Brothers, Inc. (53)

ASCORBIC ACID
Merck & Co. (134)
Chas. Pfizer Co., Inc. (135)
Winthrop-Stearns, Inc. (97)

AUTOCLAVES
Laboratory Equipment Co. (29)

BAGGER, POTATO (Weighing Type)
Food Machinery Corp. (113-114-115)

BALANCES, ANALYTICAL
Laboratory Equipment Co. (29)

BAROMETERS
Laboratory Equipment Co. (29)
Wallace & Tiernan Co., Inc. (3-4)

BASKETS
Atlas Pacific Engineering Co., Inc. (82-83-84) (Horizontal)
Benner-Nawman, Inc. (Retort) (43-44)

BATHS, WATER
Laboratory Equipment Co. (29)

BELTS—Conveyor
Benner-Nawman, Inc. (43-444)

BENZOYL PEROXIDE (Flour Bleaching Agent)
Winthrop-Stearns, Inc. (97)

BEVERAGE MATERIALS
Oakite Products Co. (2)

BIN, PACKING (Citrus)
Food Machinery Corp. (113-114-115)

BLANCHER
Atlas Pacific Engineering Co., Inc. (Draper Type Hot Water) (82-83-84)
Benner-Nawmann, Inc. (Asparagus) (Hot Water) (43-44)
Food Machinery Corp. (Vegetable) (113-114-115)

BLANCHING BASKET
Food Machinery & Chem. Corp. (113-114-115)

BLENDORS
Laboratory Equipment Co. (29)

BLENDS, VEGETABLE
California Vegetable Concentrates, Inc. 153

BLOWER, INDUSTRIAL
E. C. Buehrer Associates, Inc. (Distributors for G. E. Electric) (119)

BOARDS, PAPER
Food Machinery Corp. (113-114-115)

BOTTLES
Glass Container Mfg. Institute (Glass) (Bottles & Jars, Closures) (47-48)

BOXER
Food Machinery & Chemical Corp. (113-114-115)

BOXES
Atlas Pacific Engineering Co., Inc. (Shaker) (82-83-84)
Barry-Wehmiller Machinery Co. (Exhaust) (6)
Benner-Nawman, Inc. (Lug) (43-44)
Laboratory Equipment Co. (Deep Freeze) (29)

BRINER
Atlas Pacific Engineering Co. (Single Shot) (Judge Type) (Conventional) (82-83-84)

BRUSHER, CORN SILK
Food Machinery & Chem. Corp. (113-114-115)

BRUSHES
Food Machinery Corp. (113-114-115)

BRUSH WASHERS, ASPARAGUS
Benner-Nawman, Inc. (43-44)

BUGGIES, RETORT
Benner-Nawman, Inc. (43-44)

CABINETS, HUMIDITY CONTROL
Laboratory Equipment Co. (29)

CABINET, INSTRUMENT
The Foxboro Co. (110-111)

CALCIUM CITRATE
Chas. Pfizer & Co., Inc. (135)

CALCIUM GLUCONATE
Chas. Pfizer & Co., Inc. (135)

CALCIUM PANTOTHENATE
Chas. Pfizer & Co., Inc. (135)

CANS, TIN
Continental Can Company (73-74)

CAPPERS
Cherry-Burrell Corp. (Bottle) (112)
Food Machinery & Chemical Corp. (Steel, Hand) (113-114-115)

CARBON—Decarborizing, Deodorizing & Purifying
Darco Corp. (64-65)

CASER, CAN
Food Machinery & Chemical Corp. (113-114-115)

CASTERS
E. C. Buehrer Associates, Inc. (Distributors for Rapids-Standard) (119)

CENTRIFUGES
Laboratory Equipment Company (29)

CHANGERS, SPEED
King Sales and Engineering Company (5)

CHECKER, CAN WEIGHT
Food Machinery & Chemical Corporation (113-114-115)

CHEMICALS, ODOR CONTROL
Braun-Knecht-Heimann Co. (95)

CHURNS
Cherry-Burrell Corp. (112)

CHOPPER, TOMATO
Food Machinery & Chemical Corporation (113-114-115)

CITRIC ACID
Merck & Co. (134)
Chas. Pfizer & Co., Inc. (135)

CITRUS MATERIALS
Oakite Products, Inc. (2)

CLEATING MACHINE, NAILING
Food Machinery & Chemical Corporation (113-114-115)

CLEANERS
Barry-Wehmiller Machinery Company (Bottle) (6)
Food Machinery & Chemical Corporation (113-114-115)
Food Machinery & Chemical Corporation (Can, Pea, Peach, Potato Rotary, Steam, String Bean) (113-114-115)
Food Machinery & Chemical Corporation (Dry—Bean, Fruits and Vegetables) (113-114-115)
E. C. Buehrer Associates, Inc. (Vacuum) (Distributors for G. E.) (119)
Sellers Injector Corp. (67-68)

CLEANING COMPOUNDS
Philadelphia Quartz Company of California (42)

CLYCERYL MONO STEARATE
Glyco Products Co., Inc. (96-107)

COATINGS, NON-TOXIC INDUSTRIAL
Calresin Corporation (for: Field Lugs, Fruit Picks, Berry Hallocks, Milk & Beverage Cases, Dehydrator Trays, Freezer Trays, Plywood, Cold Storage Linings, Produce Truck and Trailer Lining). (58)

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EXHIBITORS Classified by Products CONTINUED

COCKTAIL LINE, FRUIT
Food Machinery & Chemical Corporation (113–114–115)

COILS
Food Machinery & Chemical Corporation (113–114–115)

COLOR ADDED PROCESS—Oranges
Food Machinery & Chemical Corporation (113–114–115)

COLORIMETERS
American Optical Company, Scientific Instrument Division (34)
Bausch & Lomb Optical Company (150)
Laboratory Equipment Company (29)

COLORS—Certified
Wm. J. Stange Co. (89–90)

COMPOUNDS, CLEANING
Braun-Knecht-Heimann Co. (95)
The Griffith Labs, Inc. (46)
Oakite Products, Inc. (2)
Winthrop-Stearns, Inc. (97)

COMPRESSION UNITS, SHIPPING CASE
Food Machinery & Chemical Corporation (113–114–115)

COMPRESSORS
The Creamery Package Mfg. Co. (Booster, Ammonia) (30)

CONDIMENTS
The Griffith Labs, Inc. (46)

CONFECTIONERY MATERIALS
Oakite Products, Inc. (2)

CONTAINERS
American Can Company (Fibre, Metal) (117–118)
Continental Can Company, Inc. (Metal Food) (73–74)

CONTROLLING INSTRUMENTS
Minneapolis-Honeywell Regulator Co., Brown Instrument Div. (31)

CONTROLLERS
Taylor Instrument Companies (indicating liquid-level, flow, pressure temperature) (recording liquid-level, flow, pressure, temperature 39–40)

CONTROLS
Allis-Chalmers Mfg. Co. (91–92–93)

CONVEYOR BELT, FLAT-TOP STAINLESS STEEL
Food Machinery & Chemical Corporation (113–114–115)
Greer Co., J. W. (108)

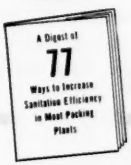
CONVEYORS
Benner-Nawman, Inc. (Screw, Roller, Can) (43–44)
Food Machinery & Chemical Corporation (Accordion, Box, Canned Fruit, Gravity, Roller and Skate Wheel, Fruits, Inspection, Intersection, Gooseneck, Package (Gravity, Power), Roller Power, Spiral, Sorting (Flat Wire), Sorting (Rubber), Sorting (Stainless Steel), Stack (113–114–115)
Greer Co., J. W. (108)

4 FREE GUIDES TO LOW-COST SANITATION

They're FREE for the Asking! Send TODAY

For Food Canners! 97 successful ways to save sanitation time, effort and money are presented in this 26-page Digest. Data on equipment sanitation and plant maintenance cleaning covers such equipment as conveyors, flumes, retorts, trays. Data also includes speedy, safe techniques for descaling such water-circulating equipment as blanchers, pasteurizers, heat exchangers. Also discussed are such subjects as odor control, mold control. Send for a free copy.

For Bottlers! Information-packed booklet offers many worthwhile suggestions for keeping plant-wide sanitation costs down. Contents include helpful data on extract and syrup room sanitation; bottle washing compounds; conveyor chain lubrication; chemical sterilization; odor control. Your free copy gladly mailed on request.



For Meat Packers! In this Digest you will find 77 fully tested ideas for cutting cleaning costs in all departments . . . killing, curing, smoked meat, cutting. You will find much valuable information on the cleaning and conditioning of hog and beef trolleys; cleaning kettles, vats, smokehouses. Send for a free copy today.

For Milk Processors! This booklet tells an interesting story of how to keep bacteria counts low. Discusses performance-proved Oakite techniques for speeding up milkstone removal; for cleaning and brightening all kinds of metal utensils; for chemically sterilizing processing units; for descaling water-circulating equipment. This 32-page booklet mailed free on request.

OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK 6, N. Y.
Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE 1909 1949 40th ANNIVERSARY YEAR

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INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

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E. C. Buehrer Associates, Inc. (Pre-Fab Aluminum) Distributors for Rapids-Standard (119)
Cherry-Burrell Corporation (Power, Bottle) (112)
Mojonnier Brothers Co. (Walking Beam) (106)

COOKERS
Food Machinery & Chemical Corporation (Continuous Pressure, Corn, Round Bottom, Round Shell) (113–114–115)
Mojonnier Brothers Co. (Fruit Spread) (106)

COOKING KETTLES
Pfaudler Co. (139)

COOKING AND PREHEATING
Food Machinery & Chemical Corporation (113–114–115)

COOLERS
Atlas Pacific Engineering Co., Inc. (Paste, Spinner) (82–83–84)
Barry-Wehmiller Machinery Company (6)
Benner-Nawman, Inc. (Spin) (43–44)
Cherry-Burrell Corp. (Cabinet, Icy Blast Unit, Rol-O-Flo Surface (stainless steel) Sweetwater, Tri-Flo Surface (tinned copper and stainless steel) (112)
The Creamery Package Mfg. Co. (Tubular Heaters) (30)
Food Machinery & Chemical Corporation (Can, Continuous Pressure, Round Bottom, Round Shell, Special, Spin, Vertical Spray (113–114–115)
Mojonnier Brothers, Co. (Compact) (106)
Pfaudler Co. (Flash Corn) (139)

CORNER TURN, POWER
Food Machinery & Chemical Corporation (113–114–115)

CORNERS, LIVE
Barry-Wehmiller Machinery Company (6)

CORN FLOUR, PROCESSED
The Griffith Labs, Inc. (46)

COUNTERS
American Optical Company, Scientific Instrument Division (Darkfield Quebec Colony) (34)
Food Machinery & Chemical Corporation (Electrical, Printing and Recording) (113–114–115)

COUPLING, SYRUP
Food Machinery & Chemical Corporation (113–114–115)

CRATE COVER, RETORT
Food Machinery & Chemical Corporation (113–114–115)

CRATE HOOKS, RETORT
Food Machinery & Chemical Corporation (113–114–115)

CRATES, RETORT
Benner-Nawman, Inc. (43–44)
Food Machinery & Chemical Corporation (113–114–115)

CRATE MAKING MACHINERY (Vegetable Melons)
Food Machinery & Chemical Corporation (113–114–115)

CREAM OF TARTAR
Merck & Co. (134)
Chas. Pfizer & Co., Inc. (135)

CRUSHER (Tomaties, etc.)
Food Machinery & Chemical Corporation (113–114–115)

CUBER, FRUIT
Food Machinery & Chemical Corporation (113–114–115)

CUPS, PAPER (for hot drinks and fresh prepared foods)
Continental Can Company, Inc. (73–74)

CUTTER, VEGETABLE
Food Machinery & Chemical Corporation (113–114–115)

DAIRY MATERIALS
Oakite Products, Inc. (2)

DEAERATOR
The Girdler Corp. (49)
Mojonnier Bros. Co. (Deaerators, Vacuum) (106)

DEFUZZER, PEACH
Food Machinery & Chem. Corp. (113–114–115)

DELEAFER, ROTARY
Atlas Pacific Engineering Co., Inc. (82–83–84)

DEODORIZER
The Girdler Corp. (49)

DETECTOR, METAL
Allis Chalmers Mfg. Co. (91–92–93)

DETERGENTS
Atlas Powder Co. Industrial Chemicals Dept. (64–65)

DEXTROSE (Refined corn sugar)
Corn Products Sales Co. (85)

DISPENSER, SYRUP
Food Machinery & Chemical Corp. (113–114–115)

DRAINER, CAN
Food Machinery & Chemical Corp. (113–114–115)

DRIER
Food Machinery & Chem. Corp. (Bulk Vegetables and Fruits) (Can, Air Blast) (Citrus) (Vegetable for Bulk Fruits and Vegetables) (113–114–115)

DRUMS, FIBRE
Continental Can Co., Inc. (73–74)

DRYERS
Barry-Wehmiller Machinery Co. (6)
Benner-Nawman Inc. (Can) (43–44)

DUCTS, MAGNETIC
Columbia Engineering Service Co. (1)

DUMPS
Food Machinery & Chem. Corp. (Lemon Box) (Box, Various Types) (Can Crate) (Corn) (Wagon and Truck) (113–114–115)

DUMPERS
Benner-Nawman Co. (43–44) (Box) (Lug Box)
Food Machinery Corp. Field Box Automatic (Twisted Belt, Twisted Chain, Elevating Stack, Elevating Stack Floor, Lemon, Wet Tomato Lug, Rotary, Deciduous) (Stacked Box) (Stacked Box, Packing House) (113–114–115)

DUSTER
Food Machinery & Chem. Corp. (Mist) (Power) (Traction Type) (113–114–115)

EBULLIOMETERS
Laboratory Equipment Company (29)

ELEVATORS
Atlas Pacific Engineering Co., Inc. (82–83–84)
Benner-Nawman, Inc. (Can, Draper) (43–44)
Food Machinery & Chemical Corporation (Boot, & Accessories for Shelled Beans & Peas, Blancher Combination, Citrus and Loose Fruit, Cut Corn Basket, Loose Fruit, Empty Box, Stack Load) (113–114–115)

ELIMINATOR, CLUSTER STEM
Atlas Pacific Engineering Company (82–83–84)

ELIMINATORS
Food Machinery & Chemical Corporation (Water, Brass Roll, Stripped Brush, Lemon Washer, Trash, Orange Dump Trash, Citrus Fruits and Vegetables) (113–114–115)

EMULSIONS, FLAVORING
The Griffith Labs., Inc. (46)

EMULSIFIERS
Atlas Powder Company, Industrial Chemicals Dept. (64–65)

END MAKING MACHINE (Egg Case, Cantaloupe, Vegetable Crates)
Food Machinery & Chemical Corporation (113–114–115)

EVAPORATORS
Mojonnier Bros. Co. (Lo-Temp) (106)
Pfaudler Co. (139)

EXCHANGER, FULL-FLO PLATE HEAT
The Creamery Package Mfg. Co. (30)

EXHAUST BOX, DISC TYPE
Food Machinery & Chemical Corporation (113–114–115)

EXHAUSTER
Atlas Pacific Engineering Co., Inc. (82–83–84)
Food Machinery & Chemical Corporation (Peerless Type) (113–114–115)

EXTRACTORS
Atlas Pacific Engineering Co., Inc. (Juice) (82–83–84)
Food Machinery & Chemical Corporation (Juice-Orange, Grapefruit, Lemon, Lime, Tangerine and Vegetable) (113–114–115)
Pfaudler Co. (139)

FEEDS
A. E. Staley Mfg. Co. (128)

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EXHIBITORS
Classified by Products
CONTINUED

FEEDERS—(Scale & Gravity)
Wallace & Tiernan Co., Inc. (3–4)

FEEDING DEVICES, CHEMICAL
Wallace & Tiernan Co., Inc. (3–4)

FERRIC AMMONIUM CITRATE
Chas. Pfizer & Co., Inc. (135)

FERROUS GLUCONATE
Chas. Pfizer & Co., Inc. (135)

FILLERS
Atlas Pacific Engineering Co., Inc. (Conventional Juice) (Single Shot) (Fruit Cocktail, Multiple Unit, Five in line) (Slot Type) (Volumetric) (82–83–84)
Barry-Wehmiller Machinery Co. (Rotary) (6)
Benner-Nawman Inc. (Hand Pack) (Straight Line) (43–44)
Cherry-Burrell Corp. (Bottle) (112)
Food Machinery Chemical Corp. (Cans) (Cartons) (Lemon Storage Box) (Condensed Milk) (Corn) (Jars) (Juice) (Oil) (Soup) (Utility, Granular and Free Flowing Products) (113–114–115)
King Sales and Engineering Co. (Piston) (Vacuum) (5)
Pfaudler Co. (Liquid) (Rotary Gravity) (139)

FILTERS
Cherry-Burrell Corp. (Pressure) (112)
Pfaudler Co. (Piston) (139)

FITTINGS
Cherry-Burrell Corp. (Sanitary) (112)
Food Machinery & Chemical Corp. Tramrail) (113–114–115)

FITTINGS AND TUBINGS, SANITARY
The Creamery Package Mfg. Co. (30)

FLAVORS
Braun-Knecht-Heimann Co. (95)
Fritzsche Bros. Inc. (53)
The Griffith Labs. Inc. (Rye) (46)

FLAVORSEAL
Food Machinery & Chemical Corp. (Citrus, Melons and Vegetable) (Wax P)

FLOORS, EMERY
The Cream

FLOUR MILL EQUIPMENT
Wallace & Tiernan Co., Inc. (3–4)

FLOW METERS
Minneapolis-Honeywell Regulator Co., Brown Instrument Division Co. (31)

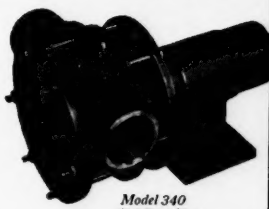
FLUMES
Benner-Nawman Inc (43–44)

FOOD COLORS, CERTIFIED
The Griffith Labs. Inc. (46)

FOREWARMERS
Cherry-Burrell Corp. (112)

FREEZERS
Cherry-Burrell Corp. (Batch Ice Cream) (Vogt Continuous Ice Cream) (112)
Food Machinery & Chemical Corp. (Automatic Continuous) (113–114–115)

NEW.. JABSCO stainless steel PUMPS



Model 340
1½" Port Size
Models also available in ¾" and 1" port sizes.

Only a Jabsco Stainless Steel Pump gives you—

A completely reversible neoprene impeller—vacuum in excess of 27" of mercury.

Pressures from 0 to 40 PSI.

Capacities up to 55 GPM of water 1750 RPM at 0 PSI.

Temperatures up to 160° F. maximum.

Instantly self-priming at all speeds—at all times.

Pumps available in bronze & other metals.

Pump Life Increased 2-3 Times with Jabsco Reversible Rubber Impeller!

Jabsco's new Stainless Steel Pump offers a better way to handle a wide variety of chemical and food pumping jobs. Jabsco's patented pumping action and flexible rubber neoprene impeller provides an unusually high vacuum for "lift" and instant self-priming. Handles most liquids—jucies, syrups, oils, brine, vinegar, and preserves—viscous and abrasive—with equal efficiency and without clogging the pump. There's no metal to metal action—completely reversible—self-lubricating and may be mounted at any angle. Write for pertinent catalog and application information on this New Jabsco Stainless Steel Pump NOW!

JABSCO PUMP CO.
2031 N. Lincoln St., Burbank, California

The pump with the Rubber Impeller

FRUIT EQUIPMENT, DRIED (Processors)
Food Machinery & Chemical Corp. (113–114–115)

FURAMIC ACID
Chas. Pfizer & Co., Inc. (135)

FURNACES
Laboratory Equipment Co. (Electric) (Muffle) (29)

GARLIC POWDER
The Griffith Labs. Co. (46)

GAUGES
Minneapolis-Honeywell Regulator Co., Brown Instrument Div. (Level) (Pressure) (31)
Wallace & Tiernan Co., Inc. (Pressure) (3–4)

GERMICIDES
Wyandotte Chemicals Corp. (69)

GLUCONIC ACID
Chas. Pfizer & Co., Inc. (135)

GLUCONO DELTA LACTONE
Chas. Pfizer & Co., Inc. (135)

GLUCOSE
A. E. Staley Mfg. Co. (128)

GLUTAMATE
A. E. Staley Mfg. Co. (128)

GLYCERYL MONO LAURATE
Glyco Products Co., Inc. (96–107)

GLYCERYL MONO OLEATE
Glyco Products Co., Inc. (96–107)

GLYCERYL MONO STEARATE
Glyco Products Co., Inc. (96–107)

GRADERS
Atlas Pacific Engineering Co., Inc. (Combination Quality Grape) (Drop Roll) (Pear, Rope Grader) (4 Screen Five Grade) (6 Screen Seven Grade) (8 Screen Nine Grade) (Senior Shaker) (82–83–84)
Benner-Nawman Inc. (Peach) (Rope) (Shaker) (43–44)
Food Machinery Corp. (Fruit and Vegetable, Size) (Vegetable, Quality) (113–114–115)

GRADERS AND SIZERS (Fruit and vegetables)
Food Machinery & Chemical Corp. 113–114–115)

GRADE TABLE (Orange, lemon, lime, tomato)
Food Machinery & Chemical Corp. (113–114–115)

GRADING TABLE, WOOD ROLLER
Food Machinery & Chemical Corp. (113–114–115)

GRINDER, NO. 5 CORN CUTTER KNIVES
Food Machinery Corp. (113–114–115)

GUMMERS, LABEL
King Sales and Engineering Co. (5)

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EXHIBITORS • Classified by Products • CONTINUED

HARVESTER
Atlas Pacific Engineering Co. (Pineapple) (82–83–84)
Food Machinery & Chemical Corp. (Corn, Potato) (113–114–115)

HEATERS
Cherry-Burrell Corp. (Boxtube, Chill-Chaser Unit) (112)
Laboratory Equipment Company (Glassware) (29)

HEATER EXCHANGER
Creamery Package Mfg. Co. (Multi-Pass Plate) (30)
Mojonnier Bros. Co. (Tubular) (106)
Walker Wallace Inc. (Stainless Steel Plate) (154)

HEAT EXCHANGE UNITS
Girdler Corp. (49)

HOISTS
Food Machinery & Chemical Corp. (Retort Crate) (113–114–115)

HOMOGNIZER
Creamery Package Mfg. Co. (Multi-Flo) (30)

HOOKS
Food Machinery & Chemical Corp. (Retort Crate) (113–114–115)

HOPPERS
Benner-Nawman Inc. (43–44)
Food Machinery & Chemical Corp. (Peas and Beans) (113–114–115)

HUMIDITY INDICATING AND RECORDING INSTRUMENTS
Foxboro Company (110-111)

HUSKERS
Food Machinery & Chemical Corp. (Green Corn) (113–114–115)

HYGROMETERS
Laboratory Equipment Company (29)

INCUBATORS
Laboratory Equipment Company (29)

INSECTICIDES
Griffith Labs. Inc. (46)

INSPECTION TABLES
Benner-Nawman, Inc. (43–44) (Roller)

INSPECTION LINE
Atlas Pacific Engineering Co., Inc. (Roll Type) (82–83–84)

INSTRUMENTS
Braun-Knecht-Heimann & Company (Scientific) (95)
Foxboro Company (Recording Pressure & Vacuum) (Recording Temperature) (110-111)
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div. (Humidity) (Industrial) (31)

JARS
Glass Container Manufacturers Institute (Glass) (47–48)

JUICER
Atlas Pacific Engineering Co., Inc. (Bottom Fill) (82–83–84)

KETTLES
Benner-Nawman Inc. (Process, Stainless Steel) (43–44)
Pfaudler (Glass-Lined Steel, Stainless Steel, Steam Jacketed) (139)
Food Machinery & Chemical Corp. (Open and Jacketed) (113–114–115)

KUROLITE
Winthrop-Stearns Inc. (Flour Maturing Agent) (97)

LABELER
Food Machinery & Chemical Corp. (Can & Glass Jar) (113–114–115)

LABELING MACHINE
Food Machinery & Chemical Corp. (Citrus Box Head) (113–114–115)

LABORATORY FURNITURE
Laboratory Equipment Company (29)

LAMPS
American Optical Company, Scientific Instrument Division (Laboratory), (Microscope) (34)
Laboratory Equipment Company (29)

LATIC ACID
Merck & Company (134)

LECITHIN
A. E. Staley Company (128)

LIDDING MACHINE
Food Machinery & Chemical Corp. (Orange, lemon, deciduous box, vegetable egg case, cantaloupe, lugs, industrial) (113–114–115)

LIGHTS
Laboratory Equipment Company (Magnifying) (29)

LINE
Atlas Pacific Engineering Company, Inc (Asparagus, E. & G.) (82–83–84)

LIQUID FLOW & LEVELING INDICATING & RECORDING INSTRUMENTS
Foxboro Company (110–111)

LOADER
Food Machinery & Chemical Corp. (Pallet) (Cans) (113–114–115)

LOWERATOR
Food Machinery & Chemical Corp. (Hydraulic Stack) (113–114–115)

MACHINERY
Food Machinery & Chemical Corporation (Bagging—Oranges, Lemons, Grapefruit, Apples, Potatoes, Onions) (113–114–115)
The Griffith Labs., Inc. (Ham Cutting) (46)

MACHINES
Atlas Pacific Engineering Co., Inc. (Dicing) (82–83–84)
E. C. Buehrer Associates, Inc. (Stencil Cutting) Distributors for Ideal (119)
Cherry-Burrell Corp. (Coil) (112)
Food Machinery & Chemical Corporation (Box Making, Filling, Glueing, Mailing, Sealing, Wrapping) (113–114–115)
Griffith Labs, Inc. (Stringing) (46)
M. O. Grove & Company (Comminuting, Filter) (136)

MAGNIFIERS
American Optical Company, Scientific Instrument Division (34)

MALLORY PASTEURIZER
Skinner Machinery Co., Inc. (123)

MARKING MACHINE (Oranges, Cantaloupe, Grapefruit, Lemons)
Food Machinery & Chemical Corporation (113–114–115)

MATERIALS
Oakite Products Co. (For Baking and Canning, Cleaning, Sanitizing) (2)
Wyandotte Chemicals Corporation (Cleaning) (69)

MEAT CURING COMPOUNDS
The Griffiths Labs, Inc. (46)

MEAT PACKING MATERIALS
Oakite Products, Inc. (2)

METERS
Laboratory Equipment Company (pH) (Titration) (29)
Minneapolis-Honeywell Regulator Co., Brown Instrument Division (pH) (31)
Neptune Meter Company (Liquid) (16)

METHYL SALICYLATE
Merck & Co. (134)

MICROSCOPES
American Optical Company, Scientific Instrument Division (Laboratory, stereoscopic) (34)
Bausch & Lomb Optical Company (Laboratory, Research, Stereoscopic Wide Field) (150)
Laboratory Equipment Company (29)

MICROPROJECTORS
Laboratory Equipment Company (29)

MICROTOMES
Laboratory Equipment Company (29)

MILK LINE, CONTINUOUS (Evaporated Milk)
Food Machinery & Chemical Corporation (113–114–115)

MILLS
Laboratory Equipment Company (29)

MINERALS
Chas. Pfizer & Co., Inc. (135)

MINERAL YEAST FOOD
The Griffith Labs, Inc. (46)

MIXERS
Food Machinery & Chemical Corporation (Corn — Blending, Duplex, Batch) (113–114–115)
The Girdler Corp. (49)
Laboratory Equipment Company (29)

MIXTURES, ASCORBIC, CITRIC
Chas. Pfizer & Co., Inc. (135)

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EXHIBITORS Classified by Products CONTINUED

MONOSODIUM GLUTAMATE
Hydrolyzed VEGETABLE Protein
These derivatives of wheat protein are being used by many food manufacturers to
IMPROVE FLAVORS IN FOODS
Write for descriptive literature and samples
THE HURON MILLING COMPANY
9 PARK PLACE NEW YORK CITY 7
In Busine... Over 70 Years

MONO SODIUM GLUTAMATE
Huron Milling Company (37–38)
International Minerals & Chemical Corp., Amino Products Div. (27–28)
A. E. Staley Mfg. Co. (128)

MOTORS
Allis-Chalmers Mfg. Co. (91–92–93)
Laboratory Equipment Company (Stirring) (29)

MOVER, CAR
Food Machinery & Chemical Corporation (113–114–115)

NIACIN
Chas. Pfizer & Co., Inc. (135)

NIACINAMIDE
Chas. Pfizer & Co., Inc. (135)

OILS
Braun-Knecht-Heimann Co. (Essential) (95)
Fritzsche Brothers, Inc. (Essential) (53)
A. E. Staley Mfg. Co. (Corn, Soybean) (128)

ONION POWDER
The Griffith Labs, Inc. (46)

OUTLET, CYPRESS TANK
Food Machinery & Chemical Corporation (113–114–115)

OVENS
Laboratory Equipment Company (29)

PANS
Benner-Nawman Inc. (43–44)
Mojonnier Bros. Company (Vacuum) (106)
Pfaudler Company (Vacuum) (139)

PASTEURIZERS
Barry-Wehmiller Machinery Company (6)
Cherry Burrell Corp. (Stainless Steel Spray) (Boxtube) (112)
Food Machinery & Chemical Corp. (Juice, Flash) (Can Empty) (113–114–115)
Pfaudler Company (Fruit Juice, Ice Cream, Juice, Milk) (139)

PEELER
Atlas Pacific Engineering Company, Inc. (Freestone Lye, Kyle Type lye Midget lye, Super Caustic, Super combination Vapor) (82–83–84)
Benner-Nawman Inc. (Caustic, Fruit & Vegtable) (43–44)
Food Machinery & Chemical Corp. (Apple, Continuous Vegetable, Peach & Pear, Rotary Pressure vegetable & certain Fruits) (113–114–115)

PERCOLATORS
Pfaudler Company (For Extract) (139)

PITTERS
Food Machinery & Chemical Corp. (Cherry, Olive, Peach) (113–114–115)

PLATES
Columbia Engineering Service Company (Magnetic) (1)
Laboratory Equipment Company (Hot) (29)

POLISHER
Food Machinery & Chemical Corp. (Citrus Fruits) (113–114–115)

POLYETHYLENE GLYCOL
Glyco Products Company, Inc. (96–107)

PORTAMIST
Food Machinery & Chemical Corp. (113–114–115)

POTS
Griffith Labs., Inc. (Solder) (46)

POTASSIUM IODIDE
Chas. Pfizer Co., Inc. (135)

POWDERS
California Vegetable Concentrates Inc. (Vegetables) (153)
Gentry Inc. (Vegetable) (35–36)

POWERSTATS
Laboratory Equipment Co. (29)

PRECISION INSTRUMENTS
Wallace & Tiernan Co., Inc. (3–4)

PRECOOKERS
Benner-Nawman, Inc. (Fish) (43–44)

PREHEATERS
Atlas Pacific Engineering Co., Inc.
Benner-Nawman, Inc. (43–44) (Stainless Steel Screw) (82–83–84)
Food Machinery & Chemical Corp. (113–114–115)

PRESERVATIVES
Griffith Labs. Inc. (46)
Merck & Company (Edible) (134)

PRE-SIZER
Food Machinery & Chemical Corp. (Citrus) (113–114–115)

PRESSES
E. C. Buehrer Associates, Inc. (Distributor) Economy Railing (Hand Electric) (119)
Food Machinery & Chemical Corp. (Car) (113–114–115)
Laboratory Equipment Company (Hydraulic) (29)

PROCESSES
Food Machinery & Chemical Corp. (Flavorseel, Color Added) (Hypoclor) (113–114–115)

PROCESSING EQUIPMENT
Food Machinery & Chemical Corp. (Hypo-clor flavorseel color added) (113–114–115)

PROCESSORS
Cherry Burrell Corp. (Round Stainless Steel Mixers coolers and pasteurizers) (112)
Food Machinery & Chemical Corp. (Continuous Juice) (113–114–115)
Mojonnier Bros. Co. (Citrus Juice) (106)

PRODUCTS
Continental Can Company, Inc. (Crown and Cork) (73–74)

PROJECTORS
Laboratory Equipment Company (29)

PROPYLENE GLYCOL STEARATE
Glyco Products, Inc. (96–107)

PROPYLENE GLYCOL
Glyco Products Co., Inc. (96–107)

PROTEIN HYDROLYSATES
Griffith Labs., Inc. (46)

PROTEINS
Huron Milling Company (Hydrolized Vegetable) (37–38)

PULPER
Food Machinery & Chemical Corp. (113–114–115)

PUMPS
Allis-Chalmers Mfg. Company (Process) (91–92–93)
Cherry Burrell Corp. (Flexflo sanitary centrifugal Stainless Steel Meterflo sanitary positive) (112)
Creamery Package Mfg. Company Centrifugal) (Stainless Steel) (30)
Food Machinery & Chemical Corp. (Corn and pulped sanitary high pressure spray, high pressure industrial, high pressure Repack Fresh Tomato. High pressure pumps for canneries and meat packing plants, Process (Horizontal and Vertical centrifugal For special conditions of temperature, Pressure, Viscosity, Chemical Characteristics) (113–114–115)
Girdler Corp. (Piston and Plunger) (49)
Griffith Labs., Inc. (Meat Curing) (46)
Jabsco Pumps Company (Rotary & Self-Priming, Stainless Steel) (35)
Laboratory Equipment Company (29)

PYRIDOXINE HYDROCHLORIDE
Charles Pfizer & Company, Inc. (135)

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PYROMETERS
Laboratory Equipment Company (29)
Minneapolis Honeywell Regulator Company, Brown Instrument Company Div. (31)

QUICK FREEZING MATERIALS
Oakite Products, Inc. (2)

READERS, MICROFILM
American Optical Co., Scientific Instrument Co. (34)

RECLEANER (Corn and peas, etc.)
Food Machinery & Chemical Corp. (113–114–115)

RECORDERS
The Foxboro Company (Multi-Record) (Segmental Chart) (110–111)
Laboratory Equipment Co. (Sound) (29)

RECORDING INTSRUMENTS
Minneapolis-Honeywell Regulator Co., Brown Instrument Div. (31)

REEL, SPINACH DRY
Atlas Pacific Engineering Co., Inc. (82–83–84)

REFRACTOMETERS
American Optical Co., Scientific Instrument Div. (34)
Bausch & Lomb Optical Co. ("Abbe-56") (Dipping) , (Hand) (Precision) (150)
Laboratory Equipment Co. (29)

REFRIGERATORS
Laboratory Equipment Co. (29)

REHUSKER, CORN
Food Machinery & Chem. Corp. (113–114–115)

RESILKER, CORN
Food Machinery & Chemical Corp. (113–114–115)

RETORTS
Atlas Pacific Engineering Co., Inc. (Horizontal) (82–83–84)
Food Machinery & Chemical Corp. (113–114–115)

RIBOFLAVIN
Chas. Pfizer & Co., Inc. (135)

RICHMOND SIFTERS
Wallace & Tiernan Co., Inc. (3–4)

RINSERS, CAN
Cherry-Burrell Corp. (112)

ROTOMIST
Food Machinery & Chemical Corp. (113–114–115)

RUNWAYS, CAN
Atlas Pacific Engineering Co., Inc. (82–83–84)

SACCHARIMETERS
Bausch & Lomb Optical Co. (150)

SACCHARIN
Merck & Co. (134)

SACKER, POTATO, AND ONION
Food Machinery & Chemical Corp. (113–114–115)

SCALDERS
Atlas Pacific Engineering Co., Inc. (Draper Washer, Low Pressure Tomato Line) (82–83–84)
Benner-Nawman Inc. (High Temperature) (43–44)
Food Machinery & Chemical Corp. (Tomato and Peach) (113–114–115)

SCALDING BASKET, TOMATO
Food Machinery & Chemical Corp. (113–114–115)

SCALES
Food Machinery & Chemical Corp. (Automatic Dump) (Citrus Fruits) (Grape) (113–114–115)
Laboratory Equipment Co. (29)
Wallace & Tiernan Co., Inc. (Merchen) (3–4)

SCREEN, VIBRATING SEWAGE
Atlas Pacific Engineering Co., Inc. (82–83–84)

SEALER, SHIPPING CASE
Food Machinery & Chemical Corp. (113–114–115)

SEASONINGS
The Griffith Labs., Inc. (46)
The Huron Milling Co. (37–38)
Wm. J. Stange Co. (89–90)

SEGREGATOR, BOX OR PACKAGE
Food Machinery & Chemical Corp. (113–114–115)

SEPARATORS
Atlas Pacific Engineering Co., Inc. (Dice Cube) (82–83–84)
Food Machinery & Chemical Corp. (Brine) (Frost) (113–114–115)

SHAKERS
Atlas Pacific Engineering Co., Inc. (Cup Down for Half Fruit) (Cup-Up for Half Fruit) (Senior Pit) (Step Type Pit) (82–83–84)
Benner-Nawman, Inc. (Fruit Turnover) (Pit) (43–44)
Food Machinery & Chemical Corp. (Fruit, Peach Pit, Dry Spinach) (113–114–115)

SIFTER, LO-HEAD GYRATORY
Allis-Chalmers Mfg. Co. (91–92–93)

SILICATE OF SODA
Philadelphia Quartz Company of California (42)

SILKER, CORN
Food Machinery & Chemical Corp. (113–114–115)

SIZERS
Food Machinery & Chemical Corp. (Apple, Peach, Celery) (Corer, Pineapple) (Fruit & Vegetable) (Potato and Onion) (113–114–115)

SLICERS
Atlas Pacific Engineering Co., Inc. (Peach) (82–83–84)
Food Machinery & Chemical Corp. (Apple and String Bean) (Peach and Pineapple) (113–114–115)

SMOKEHOUSES
The Griffith Labs., Inc. (46)

SNIPPER, BEAN
Food Machinery & Chemical Corp. (113–114–115)

SODIUM-BENZOATE
Merck & Co. (134)

SODIUM-CARBONATE
Merck & Co. (134)

SODIUM-CITRATE
Merck & Co. (134)
Chas. Pfizer & Co. (135)

SODIUM METASILICATE
Philadelphia Quartz Company of California (42)

SORBITOL
Atlas Powder Company, Industrial Chemicals Dept. (64–65)

SOY FLOUR AND GRITS
A. E. Staley Mfg. Co. (128)

SOY SAUCE
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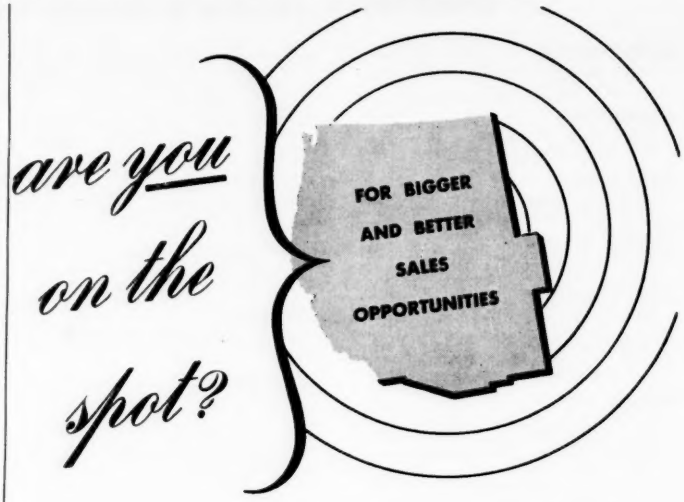
Compiled from information supplied by the IFT to the Exposition Management. No responsibility assumed for errors or omissions.



"On the spot" advertising is the key to more and better sales—just as on the spot processing is the key to lower costs, better quality, more efficient distribution.

WESTERN FOOD INDUSTRIES, a special section of *Food Industries*, is written, edited and READ by Westerners. It is aimed at the rapidly growing Western food industry—the progressive Western food processors applying the principles of Advanced Food Plant Engineering and modern food technology.

WFI's PAID circulation of 3038 is higher than that of any other publication serving the Western food field. WESTERN FOOD INDUSTRIES gives you the opportunity to sell Western food processors by advertising in a magazine of national reputation at regional rates.

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San Francisco, July 11-14
For information on rates and floor plan write:
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San Francisco, California

Western FOOD INDUSTRIES
A McGRAW-HILL PUBLICATION

a section of
FOOD INDUSTRIES
68 Post, San Francisco, California
621 S. Hope St., Los Angeles, California

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Amazing new food ingredient "brings out" and preserves peak-of-flavor in cooked or frozen foods!

TODAY many of America's famous food processors consider Staley's GLUTAMATE an essential ingredient in the products they produce—for they recognize its unusual ability to "bring out" and preserve the peak-of-flavor in many foods.

Do not confuse Staley's GLUTAMATE with flavoring agents, spices, normally used seasoning materials, or costly *blends* containing small amounts of monosodium glutamate. Staley's GLUTAMATE is a 99+% pure product. It does not flavor foods. It intensifies and maintains the natural food flavors even when foods are subjected to high cooking and canning temperatures.

As easy to use as salt

No basic formula changes necessary

Staley's GLUTAMATE is a free-flowing granular material resembling coarse table salt or fine granulated sugar in appearance. Individual crystals are transparent and colorless. A 5% water solution has a pH value of 6.8. A very small amount is required for maximum effectiveness. Range for most products is from 0.05% to 0.5% of the weight of the food.

Try Staley's GLUTAMATE (99+% pure monosodium glutamate). Descriptive literature and the services of our technical staff are yours for the asking. Write today.

A. E. STALEY MANUFACTURING CO.
DECATUR, ILL.

A. E. Staley Manufacturing Co.
Industrial Sales Department
Dept. FI-6. Decatur, Ill.

☐ Please send us one-pound trial order of Staley's Glutamate at your special introductory price of $1.56 (postage prepaid).

☐ Check enclosed. ☐ Invoice us.

☐ Please send us more information on Staley's Glutamate.

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City and State*_____

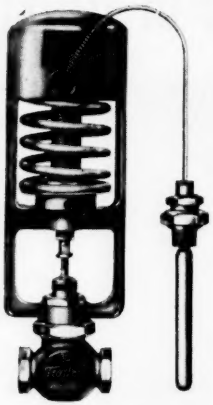
STALEY'S GLUTAMATE produced under exacting laboratory control in new $2,500,000 plant.

BOOTH 39-40 NINTH ANNUAL CONVENTION—INSTITUTE OF FOOD TECHNOLOGISTS

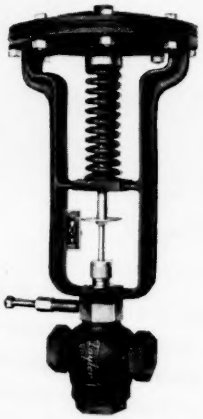
PROMPT DELIVERY

on these "bread and butter" instruments for you!

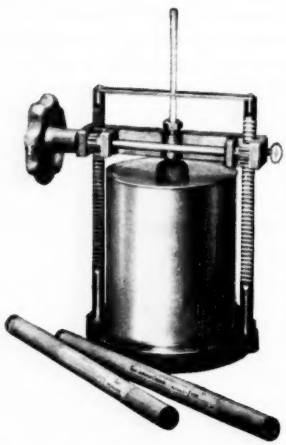
Taylor Industrial Thermometers for retorts, process kettles; retort cooling; blanchers; corn cookers and tomato concentration vats; corn cooker fillers; exhausters; hot water storage tanks, open tanks, sterilizers, peelers. Sturdy, easy-to-clean construction. 3-times-easier-to-read Binoc* Tubing.



Taylor Self-Acting Temperature Controllers for open tanks, peelers, sterilizers, hot water storage tanks, etc. Accurate—Quick Response—Dependable. Needs no auxiliary air supply. Standard with double-seated, quick-opening valves and 10 feet of smooth copper tubing.



Taylor Hi-Flow* Valve—New *maximum capacity* single-seated diaphragm valve in 150-lb. class that gives you a net flowing area equal to 90% of corresponding pipe size. Saves you money on many control applications by letting you select a smaller valve and motor.



Taylor Can Test Machines for accurately testing center-of-can temperature. Retains maximum product heat by keeping in hot vapors and juices. Assures accuracy by exact centering of thermometer. Fits all popular can sizes. Rugged construction. 18-8 stainless steel piercing blade stays sharp, cleans itself.

(Actual size)

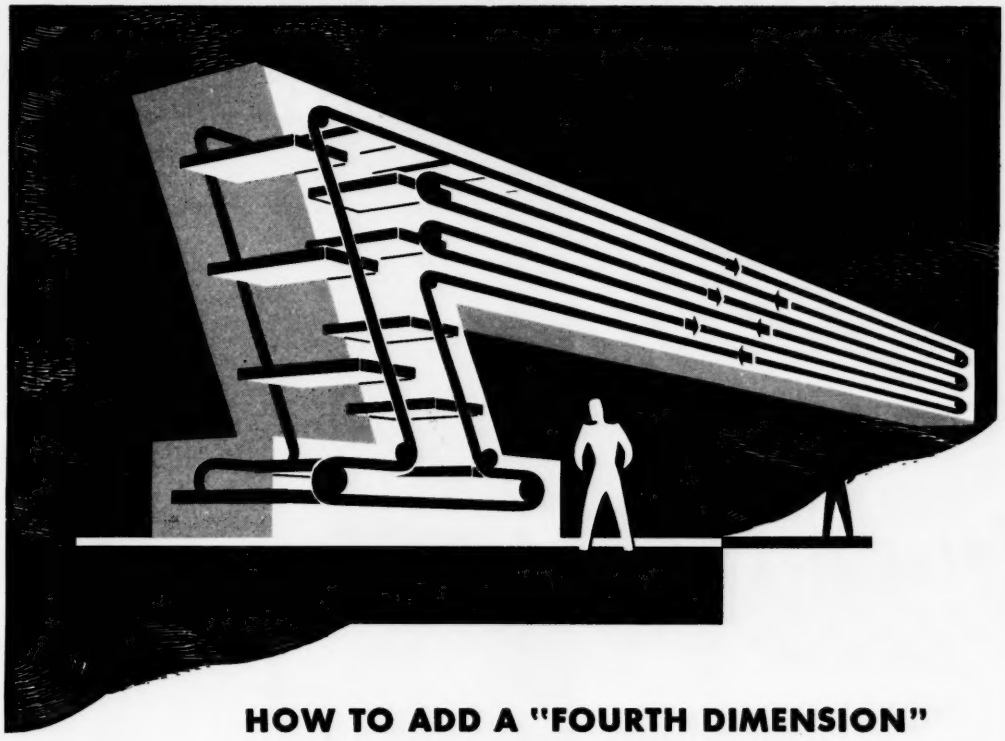
Taylor "Tell Tale" Thermometer—A 3" maximum-registering thermometer which is sealed in the can with the product so that the maximum processing temperature can be checked.

These Taylor Instruments are your "bread and butter". And they're ready for immediate delivery from stock—in plenty of time for this season's pack. Every one is precision-built to do two things—keep your quality up and your costs down. And these are just a few out of our complete line of instruments for every phase of food processing. There's not a day to lose, **so write *now* for Catalog 500.** It gives you the whole story, and its detailed flow sheet shows exactly where you need instrumentation. Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

* Trade-Mark

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



HOW TO ADD A "FOURTH DIMENSION"

to your THREE DIMENSIONAL PLANT

By giving you TIME IN MOTION, the Greer Multi-Tier performs a modern miracle in plants where products require periods of cooling, heating, molding, drying, freezing, curing, humidifying, or pasteurizing. The Multi-Tier utilizes otherwise wasted space *overhead or below the floor level,* thereby releasing a great deal of valuable floor area for increased production.

Moving continuously, the trays of the Multi-Tier are filled with your product at whatever rate is necessary to match your production. The trays, permanently attached to roller chain, always move perfectly level from tier to tier without jar or jolt.

Write today outlining your problem and we will show you how the Greer Multi-Tier can increase production and save space in your present plant.

GREER MULTI-TIER

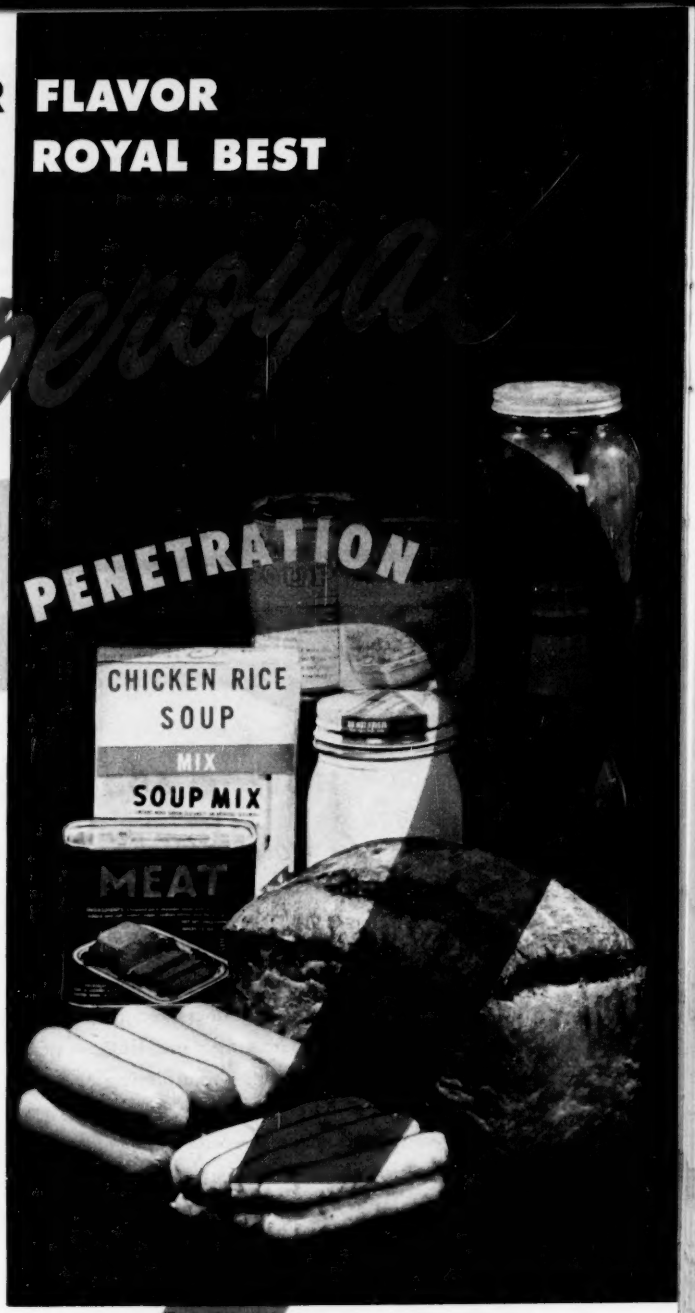
J. W. GREER COMPANY
125 WINDSOR STREET, CAMBRIDGE 39, MASS.

Manufacturers of *Continuous* Production Machinery

TRUE PEPPER FLAVOR AT ITS ROYAL BEST

Pepperoyal

Solubilized for PENETRATION



PEPPEROYAL is one of many, widely-used but unheralded Griffith spices! It is widely used in quality food products because of its *true pepper flavor* . . . extracted by Griffith from prime quality black pepper.

PEPPEROYAL is widely used . . . alone or as one spice in Griffith Solubilized Seasoning formulae . . . because the Griffith process of Solubilizing gives you *true pepper flavor* in a form that assures *penetration!*

Penetration is the *crucial* quality in flavor control! PEPPEROYAL has that quality . . . the full flavor content disperses easily and blends thoroughly with your product—because it is *Solubilized!* Only Griffith produces PEPPEROYAL.

Only Griffith can assure you of controlled, *uniform* flavor from the pepper berries to your finished product. Order dependable PEPPEROYAL today.

The GRIFFITH LABORATORIES

(Every seasoning formula—even yours—can be Solubilized. Converting ground spice formulae to Solubilized Seasonings is a Griffith specialty. Let us show you all advantages.)

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St. • LOS ANGELES 11, 49th & Gifford Sts. • TORONTO 2, 115 George St.

"HOW TO EQUIP A MODERN CANNING PLANT"

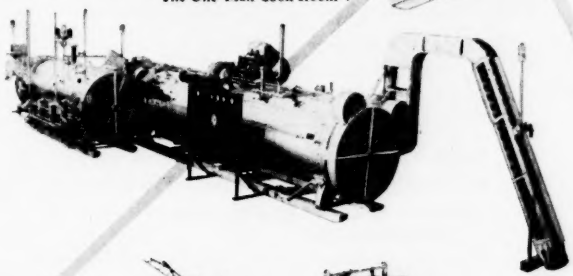
... could be another title for this 260-page FMC catalog

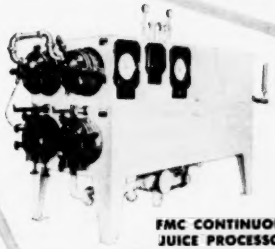
Every machine shown in the FMC Catalog is designed to "turn the scales" toward more profits, by keeping costs down while raising quality and yield. Illustrated below are a few examples of the money-saving products described in the big FMC Catalog. Write for your FREE Copy.

BLANCHER; ALL-STEEL WELDED
Sturdy; economical; sanitary; easy to keep clean.

"Field-Proven"
FMC SWEET CORN HARVESTER
It picks sweet corn faster, without bruising the tender kernels—under all field conditions. Picks ears from two rows simultaneously. It is designed for detachable mounting on standard Farm Tractors.

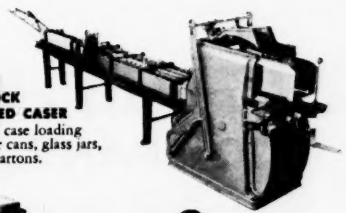
A-B CONTINUOUS PRESSURE COOKER AND COOLER
Completely automatic. You can keep it in continuous operation cooking vegetables, fruits, meats. Improves quality; saves time; cuts costs. Send for booklet, "The One-Man Cook Room".

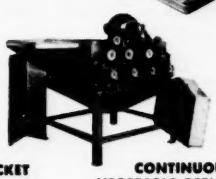




FMC CONTINUOUS JUICE PROCESSOR
The "Flash" Pasteurizer in this 4-Unit Equipment offers your best guarantee of safely processed tomato juice.

NEW FMC NON-SHOCK HIGH-SPEED CASER
High-speed case loading machine for cans, glass jars, and paper cartons.





M&S 20-POCKET PLUNGER FILLER—Highest speed Filler for cans or glass jars (up to 450 per min.). Handles wide range of sizes for great variety of products.

CONTINUOUS VEGETABLE PEELER
Peels faster with less waste; peels to correct shape and smooth finish.

Latest FMC Machinery for Processing, Canning, Packing

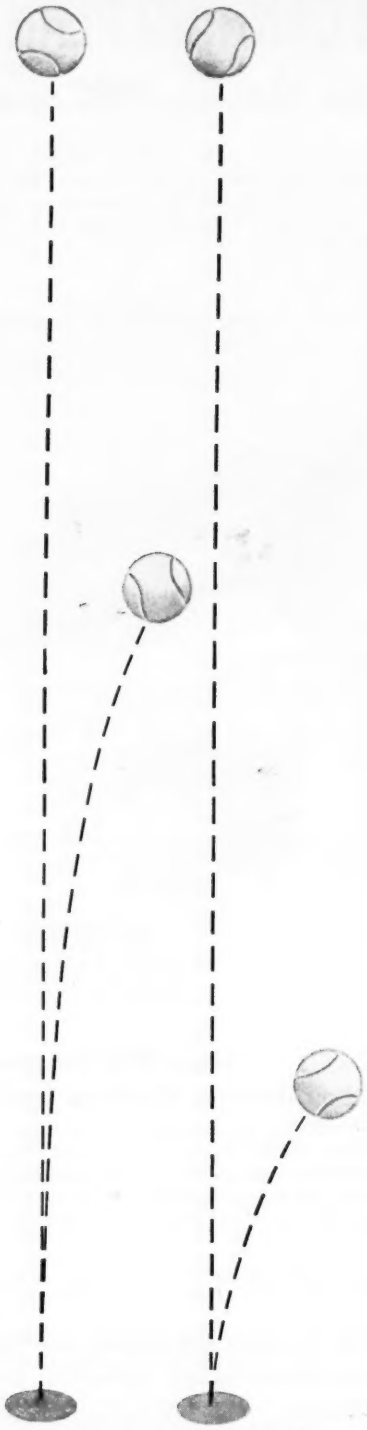
At practically every step in your operations, from picking in the field to loading the finished product, there are FMC Machines to do the job faster, better and more economically. Each piece of FMC Equipment is the most modern and finest of its kind, whether it is for Processing, Canning or Packaging, Labeling, Casing or Case-Sealing.

Write for detailed information today or get in touch with your nearest FMC Canning Machinery Representative.

D-500R

FOOD MACHINERY AND CHEMICAL CORPORATION
SPRAGUE-SELLS DIVISION • HOOPESTON, ILLINOIS

Sales Branches: Baltimore, Md. • New York, N.Y. • Rochester, N.Y. Bradford, Vt. • Cedarburg, Wis. • Lakeland, Fla. (Florida Division) San Jose, Calif. (Anderson-Barngrover Division)



Getting "more bounce" into your business

Some 15 years ago a simple packaging trick put more bounce into tennis balls.

The trick—putting them in a key-opening can under pressure—pleased everybody.

Inventories could be built up in slack seasons without fear that the tennis balls would go stale.

Shelf and window displays could be made in sporting goods stores easily.

Players had tennis balls with more bounce . . . any time . . . any place.

Perhaps similar expert packaging advice on the part of American Can Company will get "more bounce" into your product.

Canco know-how in devising new and better packaging methods has paid off in extra profits for others for 48 years. Maybe it can do the same for you.

AMERICAN CAN COMPANY

New York · Chicago · San Francisco

CALL CANCO FIRST

Advanced Instrumentation
...GEARED TO FOOD PROCESSING!..

BROWN ADVANCED INSTRUMENTATION includes the three elements necessary for profitable measurement and control . . . *products, engineering,* and *service!*

The list of *products* . . . headlined by the famous *ElectroniK* Potentiometer . . . includes indicating, recording and controlling instruments for temperature, pressure, flow, liquid level, pH, conductivity, density, or any other variable.

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The *service* is nation-wide and is performed by an organization operating from fifty-five branch offices . . . factory-trained to help you attain more profitable operation.

Your local Brown engineer is as near to you as your phone. Call him in today for a discussion of Advanced Instrumentation for your processing.

Write, today, for your copy of Bulletin 12-8.

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
4502 Wayne Avenue, Philadelphia 44 Pa.
Offices in principal cities of the U. S., Canada and throughout the world

MINNEAPOLIS Honeywell *Advanced Instrumentation* FOR THE FOOD INDUSTRY BROWN INSTRUMENTS

REDUCE *your hidden* "TAXES"

Slime, off-odors, decreased production, and water contamination are all hidden "taxes" that decrease your profits. But these "taxes" are UNNECESSARY! — IF — you use In-Plant Chlorination. Here's how this winning formula halts these unfair penalties.

SLIME "TAX" — In-Plant Chlorination removes all slime because it prevents bacterial growths at all points.

ODOR "TAX"—In-Plant Chlorination reduces off-odors because it kills the bacteria that produce them.

DECREASED PRODUCTION "TAX"—In-Plant Chlorination increases production by greatly reducing clean-up time.

WATER CONTAMINATION "TAX"—In-Plant Chlorination sterilizes the wash water, fluming water, and cooling water, thus preventing product contamination from those sources.

In-Plant Chlorination applied by W&T equipment increases profits by reducing cleaning costs, increasing production, preventing product contamination from unsterilized water, and by the increased efficiency of working in a "spic and span" plant.

Whether it be canning or freezing, removal of these "taxes" will increase your profits.

REPEAL THESE HIDDEN "TAXES". Vote the straight ticket, the Wallace & Tiernan ticket of In-Plant Chlorination applied by W&T equipment.

I-25

WALLACE & TIERNAN COMPANY, INC.

CHLORINE AND CHEMICAL CONTROL EQUIPMENT

NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

How to control and eliminate ODORS

ODORS: PHYSIOLOGY AND CONTROL summarizes all advanced knowledge of odors and offers a unique theory of odor stimulation. It provides extensive information on a variety of measures for the elimination of odors in food, in industry, in the home, and on the person. You're shown the methods being used to combat and eliminate odors, together with many other theories and little known facts about them.

This practical guide gives you a working knowledge of olfactory physiology and control; discusses the relationship between health and odors, the control and abatement of odor nuisances, the legal aspects pertaining to such control, and the enjoyment of odors.

JUST PUBLISHED!

ODORS: Physiology and Control

By Carey P. McCord,
The Industrial Health Conservancy Laboratories, Detroit
and Wm. N. Witheridge,
Ventilation Consultant, General Motors Corporation, Detroit

397 pages, 6 x 9, Illustrated, $6.50

Not only does this volume describe the effects of odors on health but it explains the forward strides medicine, chemistry, and engineering are taking towards controlling and eliminating offensive odors. It explains how offensive odors can cause lowered appetities for foods and waters, impair respiration, cause insomnia, mental perturbation, etc.

CONTENTS:

1. The Anatomy of the Olfactory System 2. The Physiology of the Olfactory Sense 3. Chemical Constitutions and Odors 4. Odor Classification 5. Odor Detection and Measurement 6. The Pathology and Perversions of the Olfactory System 7. The Influence of Odors on Health and Comfort 8. Human Body Odors in Health 9. Human Body Odors in Disease 10. Odors in the Diagnosis of Disease 11. Household Odors 12. Odors of Waters and Foods 13. Industrial Odors 14. The Offensive Trades 15. Air Conditioning and Odors 16. Chemical and Physical Destruction of Odors 17. Odor Masking 18. Odor Cancellation and Counteraction 19. The Sorption of Odors 20. Odors as Warning Agents 21. Odor Repellents and Odor Attractors 22. The Making of an Odor Survey 23. The Legal Aspects of Odor Nuisance

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ODORS FOUND IN: FOODS — explains why foods often acquire odors during storage and processing . . . the effects of deep freezing on foods . . . how heat treatment, dehydration, refrigeration, vacuum storage, etc. are used to control odors caused by microorganisms and chemicals. **INDUSTRY** — explains odor nuisances in the atmosphere . . . how far and under what conditions odors travel before complete dissipation . . . how valuable materials are recovered from odorous materials, etc. **THE BODY** — explains natural body odors, body odor vagaries, and odors in disease . . . how deodorants serve through masking, neutralizing, or counteracting odor-producing substances. **THE HOME**—from basement to attic, you get the facts about odors in the home and how to eliminate or control them. Explains the construction and ventilation faults that bring about odor nuisances in the home.

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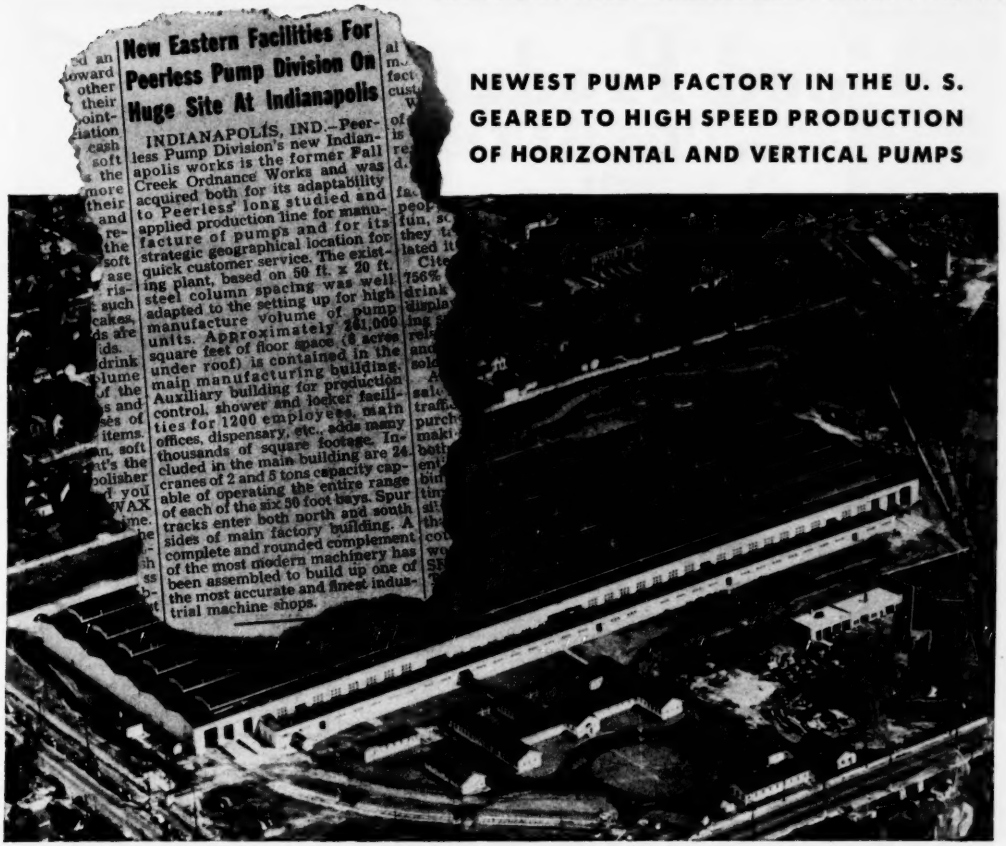
New Eastern Facilities For Peerless Pump Division On Huge Site At Indianapolis
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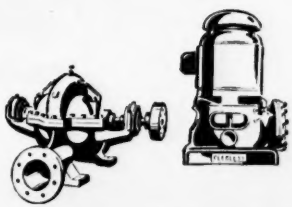

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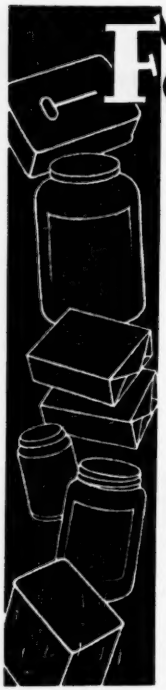

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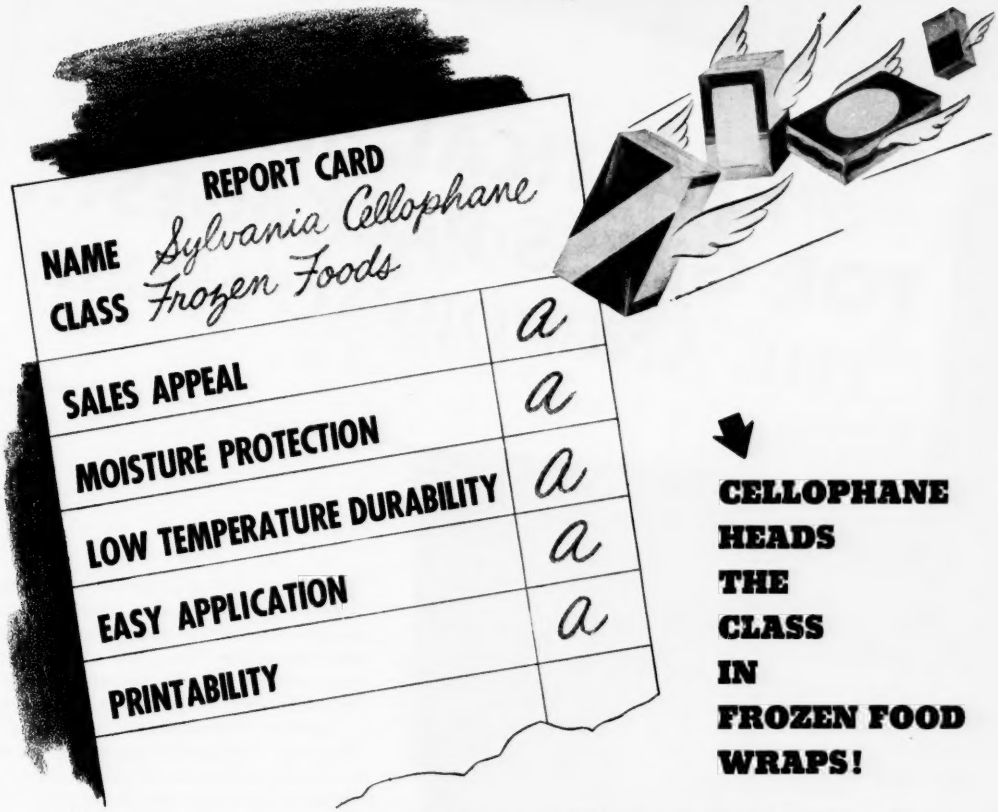

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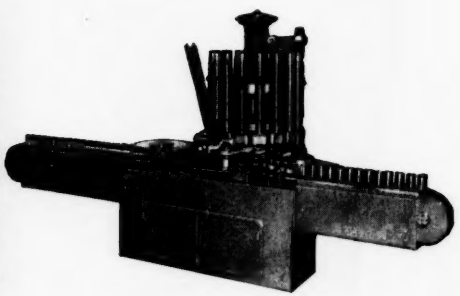

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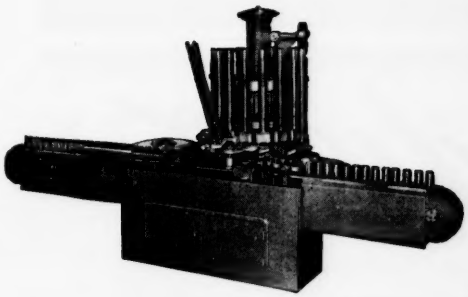

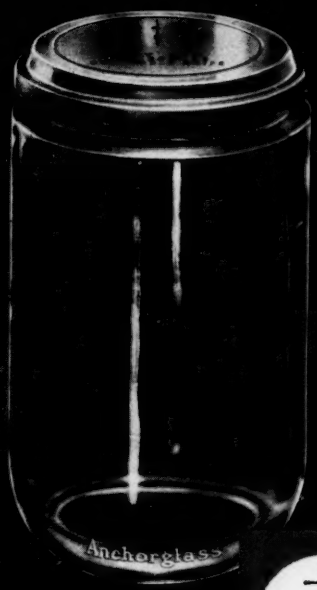

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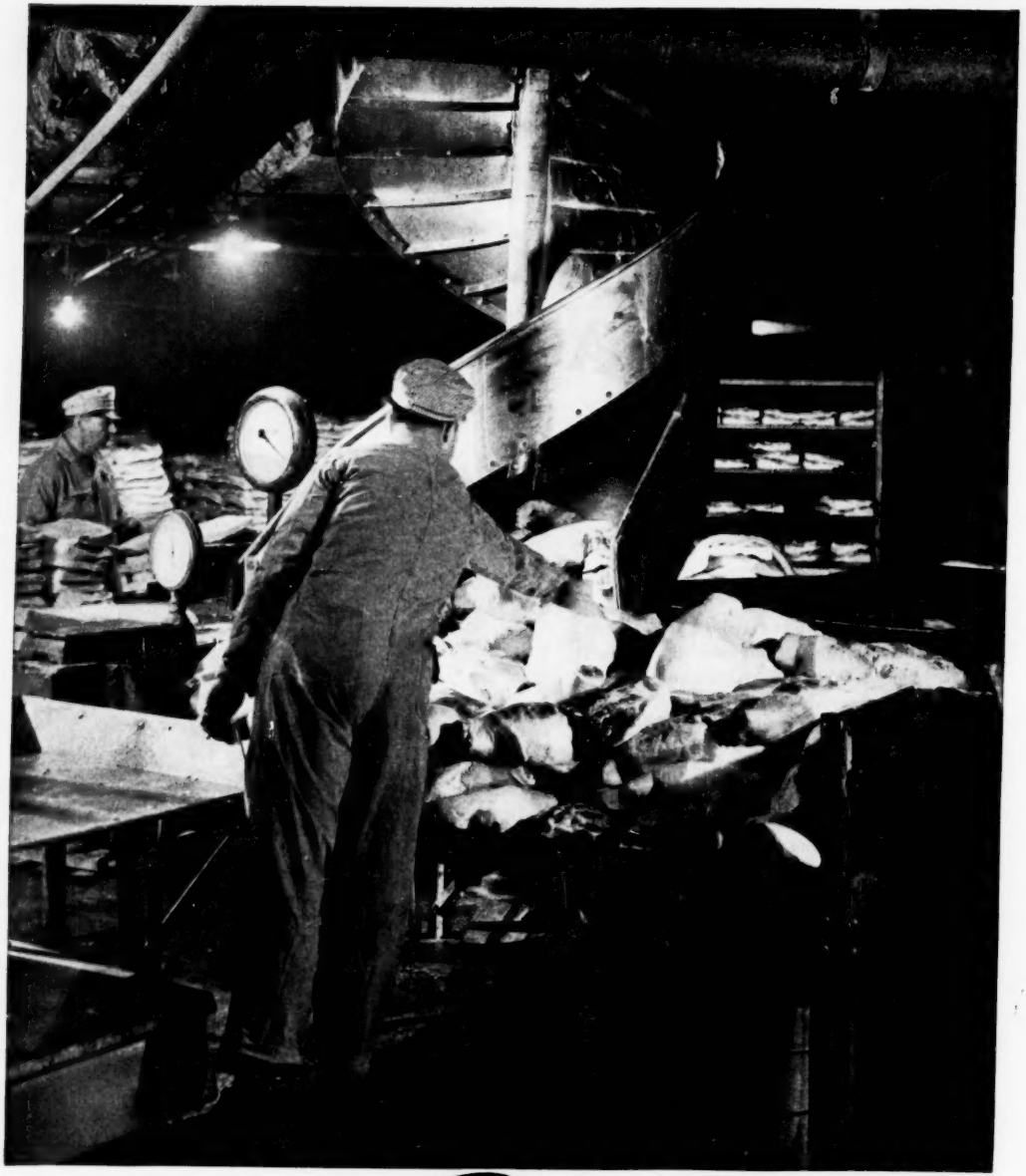

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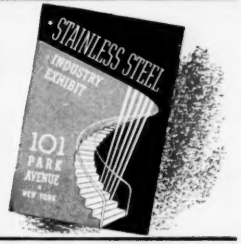

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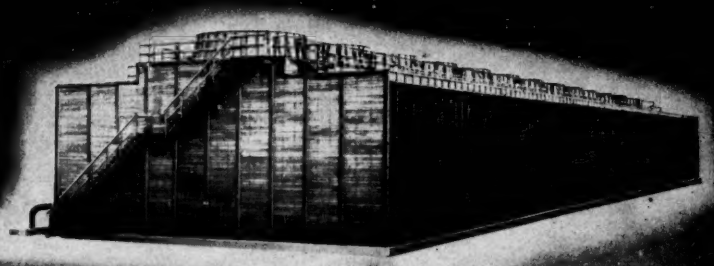

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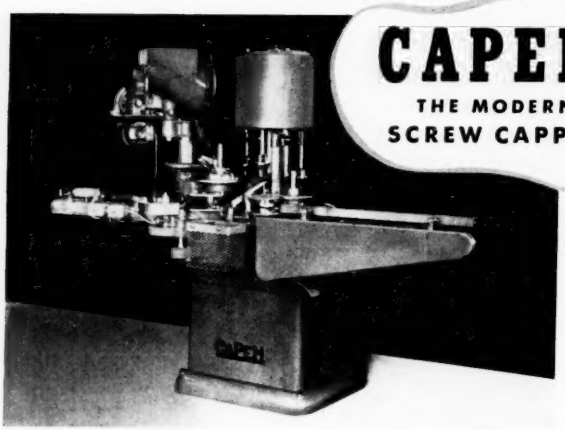

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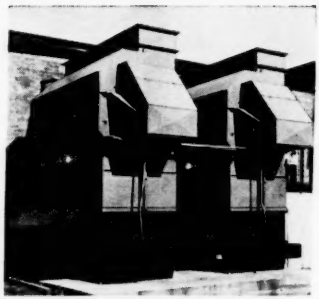

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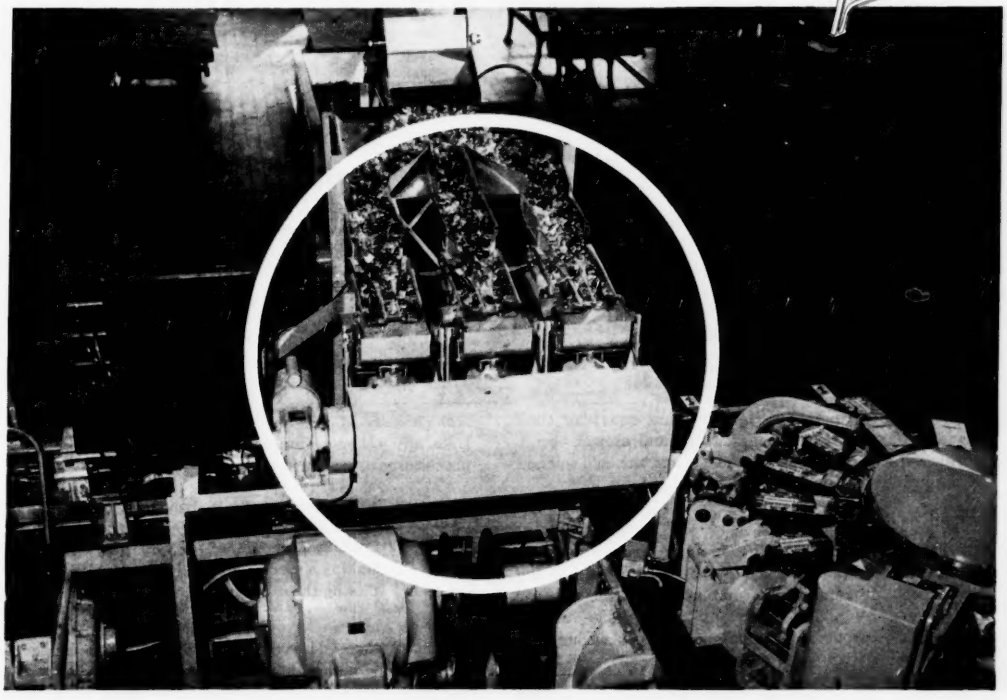
INDUSTRIAL COOLING HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

PACKAGING SHOW HIT!

Wright's new Hy-Tra-Lec Automatic Weigher Model "M" was shown for the first time at the Packaging Exposition. Seen in action by thousands were two machines—one weighing and filling candy, and the other weighing and filling wood screws. If you were unable to attend the Show, write now for literature. Get the facts about this new machine which net weighs and fills free-flowing dry products at high speeds with superior accuracy.



. . . . reduces your costs

You have heard packaging experts discuss Wright's Hy-Tra-Lec Automatic Weighers. The principles incorporated in these machines are new in automatic packaging. "Positive displacement" is used rather than beam or spring scales. Definitely, a marked technical departure from conventional weighing methods. Definitely, a cost reducer as proved in more than 100 customer plants.

Yes, if you package free-flowing dry products, Hy-Tra-Lec warrants investigation. Costs are reduced by net weighing at high speeds with superior accuracy. Ranges: One-half ounce to 16 ounces. Available with one, two, three, or four weighing heads. Send an ample quantity of your product for testing purposes and we will give you a prompt report.

WRIGHT
MACHINERY COMPANY
EST. 1893 · DURHAM, NORTH CAROLINA
SUBSIDIARY OF THE SPERRY CORPORATION

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

What's so glamorous about advertising?

THERE IS A curious belief in some quarters that advertising lives in a glamorous and almost occult world of its own, quite insulated against the cold science of the production line.

That, of course, is pure Hollywood.

Advertising today (in the *business* press, at least) is about as glamorous as a drop forge, and twice as efficient. It can become just as important to your profit-and-loss picture as plant maintenance, safety engineering, production techniques or cost-accounting. Maybe even a little more so.

Because the biggest plant capacity, and the best production know-how, can't create a single dollar of profit—*not until something is sold.* And selling, in our economy, is a mass production job!

Advertising simply provides the necessary machinery. It is the application of assembly line methods to the *manufacture of a sale.* For sales don't just "happen." Like any other commodity, they require a series of processing operations. Usually, it takes five:

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

By *mechanizing* the first three of these operations, advertising enables your salesmen to concentrate on the two jobs which they alone can do, and do best. And nowhere does the machinery of advertising work more efficiently than in the business press, where it reaches the greatest number of interested prospects, at the lowest possible cost.

Maybe—to the man who appreciates machinery—advertising is a pretty glamorous business, at that!

FOOD INDUSTRIES

A McGRAW-HILL PUBLICATION

330 West 42nd Street

New York 18, N. Y.

INGREDIENTS
FOR THE FOOD PROCESSOR

CARROT OIL
makes foods
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

A BOOKLET YOU WILL WANT

SUPPLEMENTS
of Interest to
DAIRY TECHNOLOGISTS

GBI

Filled with suggestions covering the production and quality control of cultured dairy products, ice cream and vitamin fortified milk, butter and cheese.

Write Today—Ask for
CATALOG No. 277
GENERAL BIOCHEMICALS, INC.
50 LABORATORY PARK — GBI — CHAGRIN FALLS, OHIO
Reg. U. S. *Pat. Off.*

LARGE AND REGULAR SUPPLIES OF GENUINE
GREEN TURTLES

For Immediate Delivery Ex. Coldstores, Miami, Florida.

Packed in 50-lb. and 100-lb. cartons. Meat and/or offals, calipe etc., can be offered at very low prices.

Interested parties are invited to contact

BAHAMA FOOD PRODUCTS LTD.
P. O. Box 1411 Nassau, N. P.
CABLES: LEANSE NASSAU

For Every Business Want
Think "Searchlight" First
"Searchlight" — classified Advertising — "spots" current Employment, Equipment and Business Opportunities—both offered and wanted—in the industry served by **FOOD INDUSTRIES.**

PROTECT BRAND REPUTATION

For full or empty transparent packages. Thorough detection assured. Magnifying lense (14" dia.) adjustable focus, even light distribution by new 5-way panel.

AND QUALITY
with faster, more thorough
"STANDARD" INSPECTORS

(Patented)

Ideal for
BREWERIES • DAIRIES
DISTILLERS • BOTTLERS
WINERIES • PACKERS

For Prices and complete details write to
WALTER J. WARD & CO.
Marshall Bldg.
CLEVELAND, OHIO

WHERE TO BUY
Featuring additional Equipment Materials and Supplies for the Food Processing Industries

---

SPECIALLY ENGINEERED MACHINES CUT COSTS—SPEED UP PRODUCTION SAVINGS FROM 30% TO 950%!
Our efficient machines pay for themselves out of savings in a short time. **FREE COST SAVINGS ANALYSIS** on your production problem.
MECHANICAL MACHINE & TOOL WKS.
517 N. Halsted St. Chicago 22, Ill.
Designers, Engineers, Builders

DELIVER your shipments faster. Save $600 a year with Marsh Stencil Machines, Brushes, Inks! Electric and Hand Operated machines cut ½", ¾", 1" letters. For sample stencil, Shippers' Handbook, prices, pin this to business letterhead with your name.

MARSH STENCIL MACHINE CO.
48 Marsh Bldg. • Belleville Ill., U. S. A.

POINT OF SALE ADVERTISING
Colorful - Self Adhesive - Cellophane, processed in Rolls. Easy to buy - Easy to apply - used for Packaging - Point of Sale Advertising - Dealer Instructions - Distributor literature imprints.
TOPFLIGHT TAPE CO. YORK, PA.

NEW ADVERTISEMENTS
must be received by May 18th to appear in the June issue.
Address copy to the Classified Advertising Staff
FOOD INDUSTRIES
330 West 42nd St., New York City

KIWI CODE DATER
Clamps on any conveyor. Top, side or bottom. Automatic, Unconditionally Guaranteed. Economical, Accurate, Neat. Write for Details.
KIWI CODERS CORP.
3804 No. Clark St. Chicago, 13, Ill.

HUNTING FOR GLYCERINE?

Armour has it as close as your phone. Just call the nearest of Armour's 332 convenient stock points for all grades. Quick delivery keeps your inventories low.

ARMOUR *Glycerine Division*
Armour and Co., 1355 W. 31st St., Chicago 9, Ill.

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

Does your advertising manager rate an invitation to the management table?

IF YOU SHOULD ASK *him*, he'd probably say "yes." And his reasoning might run something like this:

Management's first responsibility is to show a fair profit. This requires a relentless search for continued improvement – in design, in purchasing, in production, research and cost-accounting. Each deserves its place at the management table. Yet none of these activities can actually create a dollar of profit, for the simple reason that you can't *produce* anything at a profit – not unless you can also *sell* it.

And that's what makes the advertising manager's job so important.

His first responsibility is to see that your company's products are made familiar (and desirable) to the greatest number of prospects, at the lowest possible cost. In fulfilling this responsibility, he sets a parallel course with the sales department, although his approach more closely resembles that of the assembly line technician.

For advertising, as he sees it, is simply the application of assembly line techniques to the *manufacture of a sale*. Just consider the five basic steps involved:

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

By *mechanizing* the first three of those steps, advertising increases management's chance to show a profit. It leaves your salesmen free to concentrate on the two jobs which they alone can do, and do best.

And nowhere does this mechanizing process operate more efficiently than in the business press, where it reaches your best prospects at the lowest possible cost.

Perhaps that's why so many smart advertising managers are partial to business paper advertising – and why more of them, incidentally, are getting to sit at the management table!

FOOD INDUSTRIES

A McGRAW-HILL PUBLICATION

330 West 42nd Street

New York 18, N. Y.

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

ASSOCIATED ENGINEERS, INC.

Consulting Engineers
Food Production Development

Analysis - Processing
Structural Design
Special Equipment Design
and Development

230 E. Berry St. Ft. Wayne, Ind.

SCHWARZ LABORATORIES, INC.

Chemical and biological analyses of food materials and products. Food plant design, inspection, process examination and control. More than 75 years of experience serving the food and beverage industries.

Write for bulletin
"Scientific Quality Control of Foods and Beverages"

202 East 44th St. New York 17, N. Y.

J. Paul Bishop and Associates

Consulting Chemical Engineers and Food Technologists

Reports—Layouts—Canning and Freezing Processes—Food Bacteriology—Sanitary Control—Food Engineering — Atmospheric Pollution — Unit Operations—Process, Product and Equipment Design—Industrial Heating, Ventilating, Air Conditioning and Refrigeration.
Write for brochure—mentioning this publication.
105 North Second Street Champaign, Illinois

FOSTER D. SNELL, INC.

Research Chemists and Engineers

A staff of 75 including chemists, engineers, bacteriologists and medical personnel with 10 stories of laboratories and a pilot plant are available for the solution of your chemical and engineering problems. Write today for Booklet No. 13, "The Chemical Consultant and Your Business"
29 West 15th St. New York 11, N. Y.

FOOD RESEARCH LABORATORIES, INC.

Philip B. Hawk, Ph.D., President
Bernard L. Oser, Ph.D., Director

Research, Analyses, Consultation for the Food, Drug and Allied Industries.

Write for descriptive brochure.
48-14 33rd Street, Long Island City, N. Y.

CARL A. STEVENS

Professional Engineer

Investigations Designs Engineering
for Manufacturing and Processing Plants in
OKLAHOMA AND THE SOUTHWEST
Special Service to Small Industries

3012 E. 15th Street Tulsa 4, Oklahoma

LANCASTER, ALLWINE & ROMMEL

Registered Patent Attorneys

Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.
Suite 457, 815-15th St., N. W.
Washington 5, D. C.

JOHN I. THOMPSON & CO.

Consulting Engineers to the Food Industries

Mechanical Management and Process Engineering. Investigation and Reports. Plant Layout and Design. Methods and Procedures.

912—17th St., N. W. Washington, D. C.

LEWIN ASSOCIATES

Industrial Consultants

DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Designs—Layouts—Investigations—Consultations—Reports—Market Investigations—Consultations in all phases of Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Control and Time Studies.
260 W. 57th St., N. Y. 19, N. Y., Circle 6-0785-6

DONALD K. TRESSLER & ASSOC.

Food Technologists and Engineers

Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.

North Compo Road Westport, Conn.

MODERN VINEGAR SERVICE

Large recirculating vinegar making units to fit any requirements. Design, Installation, Operation, Alterations, Consultation.

P. O. Box 103, Station M
Los Angeles 32, Calif.

James F. Walsh & Associates

Consulting Chemical Engineers and Food Technologists

Complete Analytical, Research & Pilot Plant Facilities: For the Carbohydrate and Allied Trades—Foods, Processes, Improved and New products—General Analytical Work. Investigation of new products and processes.

OFFICES AND LABORATORIES
345 West 14th Street
Holland, Michigan

EASTERN ASSOCIATES
Meyer Moskowitz
25 Nagle Avenue
New York 34, New York

GUSTAVE T. REICH

Consulting Chemical Engineer

Development Continuous Processes
Carbohydrate Industry — By-Products
Plant Design — Waste Disposal
Carbon Dioxide

Packard Building Philadelphia 2, Pa.

A. WEISSELBERG, M. E.

Designers of Special equipment and complete plants

Quality Dehydration and Conditioning a specialty

Established 1930

31-04 Northern Blvd. Long Island City, N. Y.

Consult these SPECIALISTS

Let them save your time by bringing their broad experience in their specialty to bear on your problems.

WISCONSIN ALUMNI RESEARCH FOUNDATION

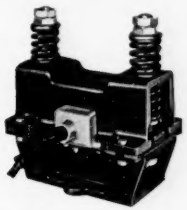
Laboratory Services

Vitamin Assays
Mineral Determinations
Food Bacteriology
P. O. Box 2059
Madison 1, Wisconsin

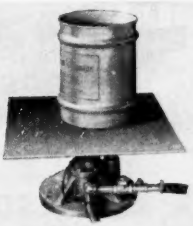
SYNTRON

"Pulsating Magnet"

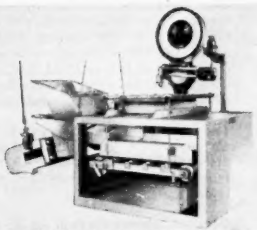
ELECTRIC VIBRATORS



Keep Bins, Hoppers and Chutes Open and Free-Flowing



PACKERS and JOLTERS
Electric-Hydraulic-Pneumatic



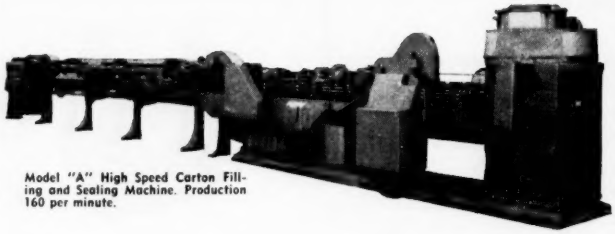
"CONSTANT WEIGH" FEEDERS
Accurate, Continuous Feed by Weight

LONG "Vibratory" CONVEYORS
No Motors, Gears or Other Mechanical Wearing Parts

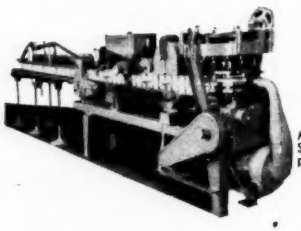
WRITE FOR LITERATURE

SYNTRON CO.
460 Lexington Homer City, Pa.

NEVERSTOP CARTON FILLER & SEALER



Model "A" High Speed Carton Filling and Sealing Machine. Production 160 per minute.



Model "E" Carton Filling and Sealing Machine. Production 60 per minute.

The "Neverstop" automatically feeds and seals cartons while in continuous motion, so that high speed production is obtained with slowly moving mechanisms. Volume filling is also accomplished without stopping the moving carton.

The "Neverstop" is extremely adaptable. Weighing or auger feed filling machines can be combined with the "Neverstop" when materials require their use. For free flowing materials having nearly constant volume per pound, the filling mechanism is incorporated in the machine, securing the advantages of less cost and floor space. For smaller cartons a made-up bag (liner) may be automatically fed and inserted into the carton before filling and, afterward, automatically folded and crimped or heat sealed.

The "Neverstop" Machines are furnished for either hand or automatic carton feed. An extremely tight seal is assured, top and bottom, since both are made in the same way. All carton flaps are glued, the first wide flap folded being crowded over into the fold of the second wide flap as it is folded down.

Detailed information will be furnished upon request. A sample package will help in specifying equipment.

STOKES & SMITH Co

PACKAGING MACHINERY — PAPER BOX MACHINERY

(A wholly owned)
subsidiary of Food Machinery and Chemical Corporation

4911 Summerdale Ave. Philadelphia 24, Pa., U.S.A.

"Better machines for better packages"

Remember - Competition Takes No Holiday

Wishing Won't Pay Dividends

COST REDUCTION and PRODUCT IMPROVEMENT Can Conquer Competition

Our unexcelled staff in Chemistry, Physics, Bacteriology, Biochemistry, Toxicology, Engineering and Practical Market Research has rendered invaluable service to many clients in food industries.

As an indication of how we can be of service to you, ask Dick Moore to send you copy of "Food and Nutrition Studies"

FOSTER D. SNELL, INC.

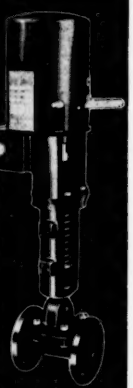
Chemists Engineers

29 W. 15 St. New York 11, N.Y. WA 4-8800

GENERAL CONTROLS

Saunders Type

HYDRAMOTOR® OPERATED VALVES



GENERAL CONTROLS G-2-17 and G-3-17 valves for the remote control of chemical solutions, acids and pulpy liquids where a slow opening automatic valve is required.

Hydramotor operator has no gears. Direct connected, motor-driven pump develops hydraulic pressure for direct action against an alloy spring loaded valve stem and seating diaphragm.

Entire Hydramotor operator is sealed in oil for life to assure constant lubrication, reduction of wear, freedom from dust, grit and other foreign matter thus insuring trouble-free operation and reduced maintenance costs. Automatically returns to closed position on current failure. Simplified two-wire control circuits. Request Catalog.

62 6

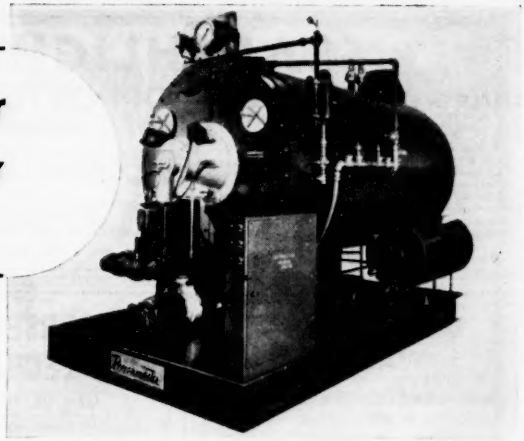
GENERAL CONTROLS

801 ALLEN AVENUE GLENDALE 1, CALIF.

Manufacturers of Automatic Pressure, Temperature, Level & Flow Controls

FACTORY BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

"One Good Powermaster Deserves Another"--SAY MANY SATISFIED USERS



Orders for *additional* O&S Powermasters are mighty good proof that it is a top-notch steam generator that will help you to:

SAVE FUEL—because its 3-pass design puts out high quality steam at *maximum efficiency* . . .

SAVE TIME—because its operation is *fully automatic*, with all parts easily reached to simplify maintenance . . .

SAVE COSTS of installation as well as operation because it is delivered with boiler, burner, controls and feed water system built into *a complete steam plant, carefully tested at the factory* . . .

Does it do all this? Yes!—say users. COCA COLA bottlers, for instance, have installed *twelve* O&S Powermasters in plants from Duluth, Minn. to Quito, Ecuador. Many other users throughout the world have bought additional Powermasters after their first unit proved its cost-saving operation.

YOU CAN CHOOSE A POWERMASTER to burn light oil, heavy oil, gas—or any combination of these fuels with change-over in a few minutes. Get new catalog describing sizes from 15 HP. up, steam working pressures from 15 to 150 pounds, by writing to **Orr & Sembower, Inc., 940 Morgantown Rd., Reading, Pa., U. S. A.**

ORR & SEMBOWER Powermaster® STEAM GENERATORS

MAILING LISTS THAT WORK . . .

McGraw-Hill Industrial Mailing Lists are a direct route to today's purchase-controlling executives and technicians in practically every major industry.

These names are of particular value now when most manufacturers are experiencing constantly increasing difficulty in maintaining their own lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance during this period of unparalleled changes in industrial personnel. These lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nation-wide field staff, and are maintained on a twenty-four hour basis.

Investigate their tremendous possibilities in relation to your own product or service. Your specifications are our guide in recommending the particular McGraw-Hill lists that best cover your market. When planning your industrial advertising and sales promotional activities, ask for more facts or, better still, write today. No obligation, of course.

McGraw-Hill Publishing Co., Inc.
DIRECT MAIL DIVISION
330 West 42nd Street New York, 18, N. Y.

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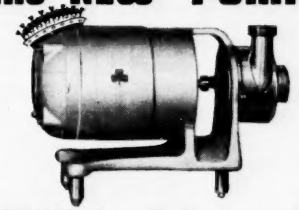
the NEW "PUMP KING" SERIES



"Pump King" series sanitary centrifugal pumps are available in 1½", 2", 2½" and 3" inlet sizes, with totally enclosed, long-life sanitary motors.

"TOPS" for all Sanitary Applications!

- Compact "Unimount" close-coupled construction.
- All highly polished stainless steel contact parts.
- Perfect alignment at all times.
- Fewer moving parts . . . easier to disassemble for cleaning.
- Pump head easily adjusted to any discharge angle.
- One-piece sanitary seal . . . easily cleaned, maintains correct sealing pressure without causing wear.

(Also available with packing gland construction or water cooled vacuum seal for special requirements.)

SEE YOUR TRI-CLOVER JOBBER OR WRITE FOR DETAILS

Tri-Clover MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

Try TRI-CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

Not available for equipment advertising
$1.20 a Line—Minimum 4 Lines.
To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices, count as one additional line.

DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $9.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F. I.

NEW ADVERTISEMENTS received by 10 A. M. June 10th will appear in the July issue subject to limitations of space available

---

DISTRIBUTORS WANTED

Established distributors for a non-toxic wood coating for food industries. A proven product with wide spread application. Protected territories for every section except the Pacific Coast.

RW-8847, Food Industries
330 W. 42nd St., New York 18, N. Y.

SALES REPRESENTATIVES WANTED

Manufacturer of efficient high pressure cleaning equipment, est. since 1860, desires sales representatives calling on food processing plants in selected exclusive territories. Company is presently selling to many of the largest food plants although it has not previously had representation in this field. The product has enthusiastic acceptance, proven performance where other equipment has not been satisfactory and original installations have brought many orders for additional equipment.

RW-8737, Food Industries
330 West 42nd Street, New York 18, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

WANTED ENGINEER—30 to 40 yrs. M.I.T. or Stevens graduate. Experienced in chemical or food. State age, experience, salary. P-8820, Food Industries.

SELLING OPPORTUNITIES OFFERED

SALES REPRESENTATIVES wanted for the sale of semi-liquid filling machinery. Contacts with food, drug and cosmetic, and chemical companies preferred. For all southern states, including Maryland and Delaware. RW-8387, Food Industries.

WANTED—SPECIAL Machinery Salesman. Top proposition to men traveling out of town industries. Mechanical Machine & Tool Wks., Chicago 22, Ill.

EMPLOYMENT SERVICES

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

SENIOR 28 years old; in the 5-year Food Technology course at M.I.T., desires summer experience in any phase of food processing field. Interested in opportunity that could lead to permanent position in the future. Available from June 5 to Sept. 24. PW-8837, Food Industries.

COURSES IN FOOD TECHNOLOGY

MEN OR WOMEN

Fundamentals and laboratory work in Canning, Freezing, Preserving, Science of Nutrition, Food Analysis, Mold Counting, Menu Planning. Night classes. Veterans paid while learning.

MIAMI SCHOOL
FOR FOOD PROCESSING SPECIALISTS
Box 383, Coral Gables 34, Florida

POSITION WANTED

BIOCHEMIST, PHD.

20 years industrial experience in food and nutrition research. Food and feed product development involving yeast, vitamins, by-products, vitamin biosynthesis, fish oils, etc. Desires position preferably in food, feed or pharmaceutical field.

PW-9011, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

Items for Ice Cream Manufacturers

On brokerage basis for Eastern States. Have excellent contacts with large buyers.

RA-9031, Food Industries
330 West 42nd Street, New York 18, N. Y.

POSITION WANTED

INDUSTRIAL ENGINEER—University trained. Age 35. Fifteen years industrial experience. Thorough knowledge, and training, in all phases of industrial engineering. Excellent background, in management, administration and organization, modern production methods and problems, and techniques of supervision. Well versed in the maintenance and operation of dry and wet line automatic packaging machinery. Successful employee relationship. Available as Chief Industrial Engineer, Maintenance, Production or Plant Superintendent. Full details and references upon request. PW-8667, Food Industries.

FOOD CHEMIST and Technologist. Masters Degree. 7 years experience in all types of foods. Supervised laboratory. Familiar with all specifications for food products. PW-7579, Food Industries.

FOOD CHEMIST, 25 years experience. Thorough practical knowledge manufacturing natural and artificial flavoring extracts. Complete line of supplies for bakers, confectioners, bottlers, fountains, institutions, etc. Can match, improve, research. Prefer steady position in or around N.Y.C. Resume with interview. PW-9019, Food Industries.

FOOD CHEMIST, eight years experience in production and control of soups, marmalades, jellies, sauces, tomato products, wishes to locate in Florida. Presently employed. PW 9023, Food Industries.

FOR SALE

String Filter.

Feinc, Serial 295, 8' x 10', iron, complete with all accessories including 12" x 6" Chicago simplex vacuum pump, etc. Reasonably priced for immediate sale. FS-9035, Food Industries.

INTERNATIONAL FOOD BROKERS

184 North 8th St. Brooklyn 11, N. Y.

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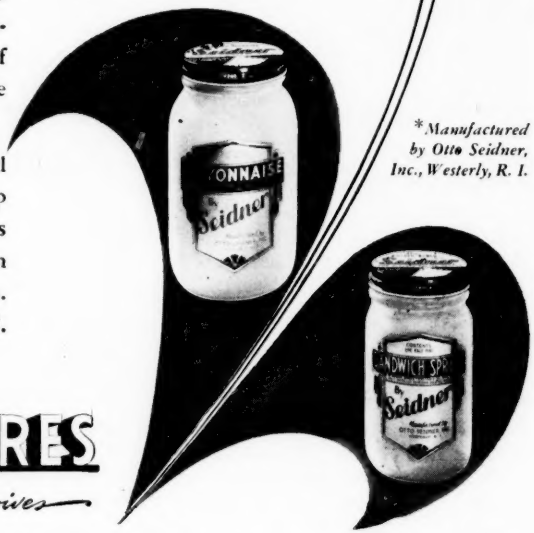

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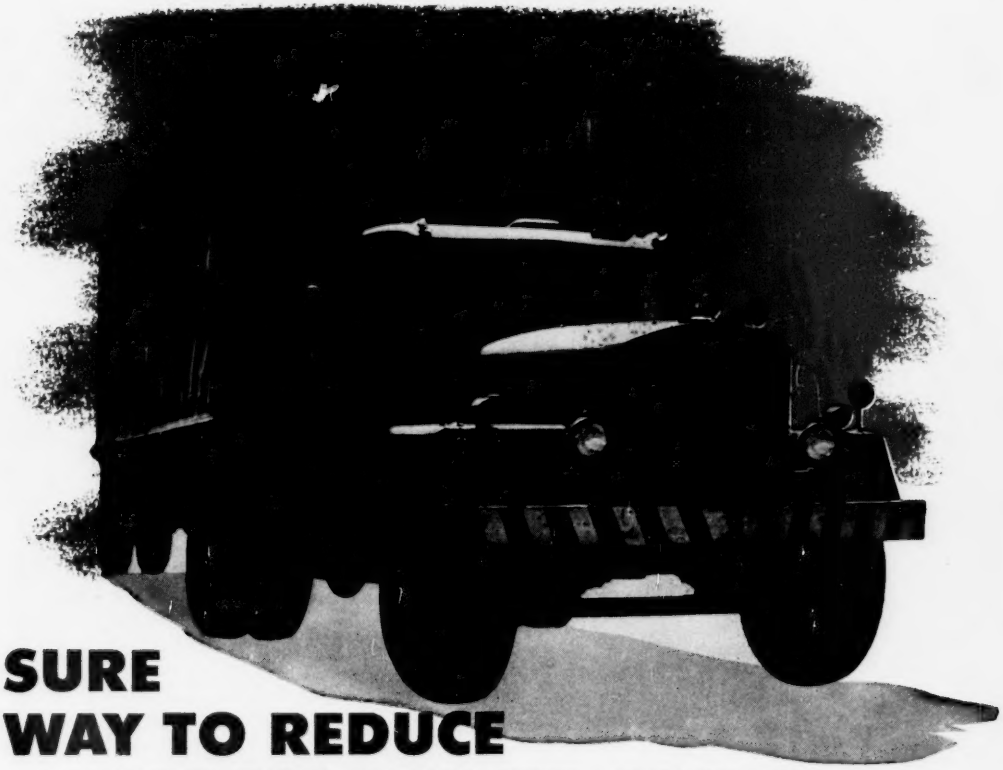

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